THE RUBBER AGE

FEBRUARY 25, 1921 VOL. VIII. NO. 10

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The Action of Certain Organic Accelerators in the Vulcanization of Rubber--III

By G. D. Kratz, A. H. Flower and B. J. Shapiro

Falls Rubber Co., Cuyahoga Falls, Ohio

It has for some time been generally recognized that although aniline is effective as an accelerator in the absence of zinc oxide, diphenylthiourea functions but mildly in the absence of, and strongly in the presence of this substance. Reference to this effect has already been made indirectly in the literature several times, and recently Twiss[1] has given curves for physical test results which demonstrate quite clearly the effectiveness of diphenylthiourea as an accelerator in the presence of zinc oxide. His statement that diphenylthiourea is practically inert in the absence of zinc oxide is, however, not in accord with our findings.

In a previous paper of this series we have shown that in the acceleration of the vulcanization of a rubber-sulphur mixture, the activity of one molecular part of diphenylthiourea is less than that of an equimolecular quantity of aniline, but equal to that of one molecular part of aniline and one molecular part of phenyl mustard oil.

Our former experiments, however, were confined to the determination of sulphur coefficients at one cure only. In the present instance, we desired to compare the relative effects of aniline and diphenylthiourea over a series of cures, and to effect this comparison both by means of the sulphur coefficients and the physical properties of the various mixtures and cures. Further, it was desired to compare mixtures which contained zinc oxide, as well as the rubber-sulphur mixtures previously employed.

In the experimental part of this paper we have given results obtained with six different mixtures, as follows a rubber-sulphur control, a control which contained zinc oxide, and similar mixtures which contained either one molecular part of aniline or diphenylthiourea. All of the mixtures were vulcanized for various intervals over a wide range of time. After vulcanization, comparisons of sulphur coefficients and physical properties were made.

Summarizing the Results

Summarizing these results briefly, we found that, in a rubber-sulphur mixture, the accelerating effect of aniline is considerably greater than that of diphenylthiourea, when judged either by sulphur coefficients or on the basis of the physical properties of the vulcanized mixtures. In mixtures which contained zinc oxide, however, the reverse was found to be true, and diphenylthiourea was more active than aniline when judged by either of the above criteria. It was also evident that in the case of the mixtures which contained zinc oxide, although the tensile strength of the mixture which was accelerated by diphenylthiourea increased more rapidly than in the case of the mixture accelerated by aniline, the same maximum tensile strength was attained by each. The sulphur coefficients at their respective maxima were practically identical. While the maximum tensile strength of the rubber-sulphur mixture which was accelerated by aniline was the same as that obtained when zinc oxide was present in the mixture, it was attained only at a much higher sulphur coefficient. Lastly, it was also found that the tensile strengths of the mixtures that contained zinc oxide and which were accelerated by either aniline or diphenylthiourea, particularly the latter, were increased tremendously during the first part of the vulcanization, and at very low sulphur coefficients. This would indicate the possibility of certain substances (accelerators) increasing the physical properties of a vulcanized mixture without greatly affecting the sulphur coefficient.

An Unexplained Phenomenon

This point is of interest as it already has been noted by ourselves, Cranor,[2] and others, that with mixtures which contain zinc oxide and a strong organic accelerator, the correct (or optimum) cure is obtained at abnormally low sulphur coefficients when compared with those obtained for unaccelerated mixtures. No explanation has been offered for this phenomenon. Bedford and Scott,[3] however, regard diphenylthiourea as the aniline salt of phenyldithiocarbamic acid after H_2S has been liberated. This salt is extremely unstable, owing to the weakly basic properties of aniline, and in this respect, according to Krulla,[4] is unlike the metallic salts of the same acid. In this connection, it is particularly pertinent to note that Bruni[5] has recently found the zinc salts of the mono and disubstituted dithiocarbamic acids to be violent accelerators. It is quite possible, then, that such a salt may be formed during the vulcanization process in mixtures which contain both diphenylthiourea and zinc oxide;[6] and that, irrespective of its action as an accelerator, the zinc portion of such a salt may be responsible for the physical improvement imparted to the mixture.

Our present results, moreover, particularly when interpreted with the assistance of the excess sulphur coefficients obtained for the various mixtures at different times of cure, show that when aniline is employed as the accelerator in the presence of zinc oxide, the effect of the latter substance is manifested almost entirely in the physical properties of the mixture.

Presented before the Rubber Division at the 60th Meeting of the American Chemical Society, Chicago, Ill., September 6 to 10, 1920. Journal of Industrial and Engineering Chemistry.

[1] Soc. Chem., Ind., 39 (1920), 125t.
[2] India Rubber World, 61 (1919), 137.
[3] Jour. Ind. & Eng. Chem., 12 (1920), 31.
[4] Ber., 46, 2669.
[5] Brit. Patents 140,387 and 140,388.
[6] The action of diphenylthiourea with zinc oxide is apparently similar to the action of the natural accelerator with magnesium oxide, as pointed out in a previous paper [This Journal, 12 (1920), 971]. In both cases the oxide serves in a contributory capacity rather than as a primary accelerator. It is obvious that no one oxide will activate all accelerators equally well.

When aniline is replaced by diphenylthiourea the reverse is true, and the activity of the original substance as an accelerator is greatly increased when measured by either the sulphur coefficients or physical properties. In the latter instance, then, the zinc oxide most probably either assists in the decomposition of the diphenylthiourea to a more active substance, or combines with the decomposition or alteration products or the original substance with the formation of a zinc salt, which is responsible

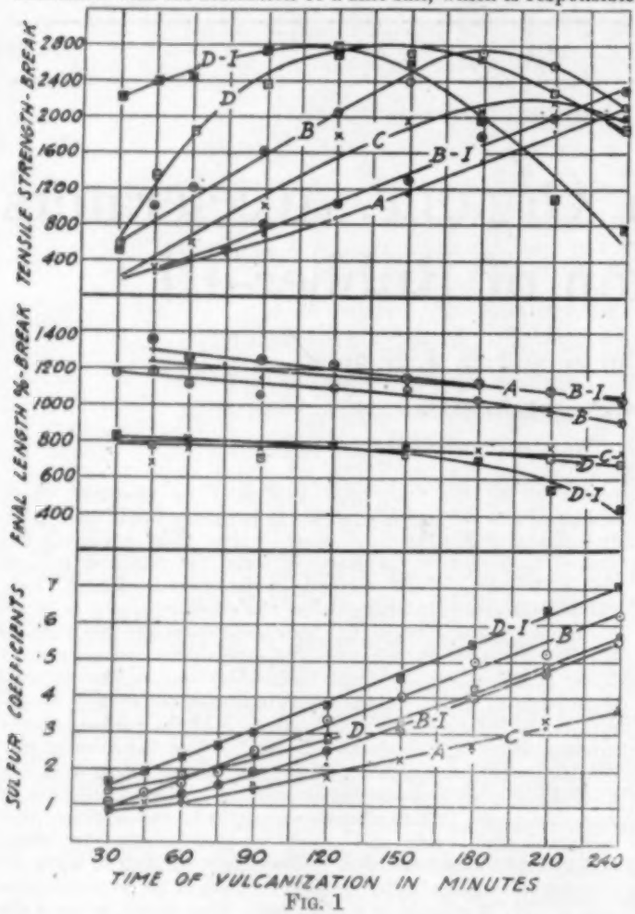


FIG. 1

for the increase both in the sulphur coefficients and tensile strength of the mixture. Our results with aniline as the accelerator, however, do not indicate the formation of such a salt.

Thus, in the presence of zinc oxide, the activity of aniline and diphenylthiourea as accelerators appears to be of different nature. Evidently, an acid substance, probably a thiocarbamic acid, capable of reacting with zinc oxide, is formed as one of the decomposition products of diphenylthiourea. The excess accelerating activity is attributed to this zinc salt. When aniline is employed as the accelerator, there is no evidence of such salt formation.

The present experiments were designed to effect a comparison of the sulphur coefficients and physical properties of representative mixtures when accelerated by 0.01 gram-molecular quantities of either aniline or diphenylthiourea. The six following mixtures were employed for this purpose, and each was vulcanized for a series of cures:

A—Rubber-sulphur control
B—Rubber, sulphur, and aniline
B-1—Rubber, sulphur, and diphenylthiourea
C—Rubber, sulphur, and zinc oxide control
D—Rubber, sulphur, zinc oxide, and aniline
D-1—Rubber, sulphur, zinc oxide, and diphenylthiourea

[1] Jour. Ind. & Eng. Chem., 12 (1920), 31.
[2] India Rubber World, 61 (1920), 356.
[3] In the experiments described in Parts I and II vulcanization was carried on at a temperature of 148° C.
[4] Satisfactory physical test results for representation graphically are obtainable with considerable difficulty. We found it necessary, particularly when seeking results for stress-strain diagrams, to employ three men one to operate the machine and two to take readings.
[5] As Whitby has stated ("Plantation Rubber and the Testing of Rubber," 1920, 395, Longmans, New York), complete stress-strain diagrams are probably required for an accurate determination of this point.

The quantities of each substance employed in these mixtures are shown in Table I. The amounts of aniline or diphenylthiourea added to these respective mixtures represent 0.01 gram-molecule of the accelerator for each 100g. of rubber in the mixture. Otherwise, the same general method of procedure was adopted in the course of this work as in that previously reported in Part I.[1]

The rubber used was of good quality, first latex, pale crepe, a different sample of the lot used in our former experiments. The various mixtures were mixed on the mill, vulcanized, and tested in the same manner as before. The physical properties of the vulcanized samples were determined on a Scott testing machine of the vertical type, with the jaws opening at the

TABLE I

INGREDIENT	Mixture A	Mixture B	Mixture C	Mixture D	Mixture B-1	Mixture D-1
Rubber	100.00	100.00	100.00	100.00	100.00	100.00
Zinc oxide	...	...	100.00	100.00	...	100.00
Sulphur	8.1	8.1	8.1	8.1	8.1	8.1
Aniline	...	0.93	...	0.93	...	...
Diphenylthiourea	...	...	...	...	2.28	2.28

rate of 20 inches per minute. A recovery period of 48 hours was allowed before physical tests were made. Combined sulphur was estimated by our method previously reported in detail.[2]

The various mixtures were vulcanized at 141.5°C. for different intervals of time up to 240 minutes.[3] The sulphur coefficients and physical properties of the different cures for each mixture were determined. These results are given in detail in Table II and shown graphically in Fig. 1. Generally speaking, the results obtained were in good agreement, and fairly smooth curves for physical properties were obtained.[4]

For brevity and clearness, the results obtained for each mixture have been considered separately.

The Results Obtained

MIXTURE A—This mixture of rubber and sulphur served as a control only.

MIXTURE B—Comparing Curves A and B, aniline not only acts as an accelerator, but also slightly increases the physical properties of a rubber-sulphur mixture after vulcanization.

MIXTURE C—The inclusion of zinc oxide in Mixture C was found to have little or no effect upon the sulphur coefficients when compared with the results obtained for A.

MIXTURE D—The sulphur coefficients obtained for this mixture were found to be uniformly lower than the corresponding cures of B. Moreover, the maximum tensile strength of D was attained at a much lower sulphur coefficient than in the case of B, although this maximum tensile strength was almost the same in both instances.

MIXTURE B-1—From the curves it is seen that in a mixture of rubber and sulphur the activity of diphenylthiourea is much less than that of aniline, when judged by either sulphur coefficients or physical properties. In fact, both the tensile strengths and final lengths of B-1 are practically the same as those of its control mixture, A. The sulphur coefficients of B-1, however, were decidedly higher than those of A, and, contrary to the statement of Twiss, we cannot regard diphenylthiourea as practically inert as an accelerator in a mixture of rubber and sulphur only.

MIXTURE D-1—The sulphur coefficients for D-1 were considerably higher than those of any of the other mixtures; although the maximum tensile strength was of the same magnitude, it was reached in shorter time.

Comparison of Lengths

The curves showing the comparison of the final lengths are given in Fig. 1. It is obvious that the physical manifestations, especially in Mixtures D and D-1, are found in the tensile strength, rather than in the final lengths, of the vulcanized mixtures. Consequently, the tensile strengths of such mixtures, particularly until maximum tensile strength was reached, are better indications of the point known as the "optimum cure" than are the loads required to effect a given extension.[5]

The effect of the two accelerators, aniline and diphenylthiourea, have been summarized in Fig. 2, wherein with Mix-

TABLE II
(All Mixtures Vulcanized at 141.5° C.)

Cure in Minutes	Mixture A			Mixture B			Mixture C			Mixture D			Mixture B-I			Mixture D-I		
	Sulphur Coefficient	Tensile Strength, Lbs. per Sq. In. at Break	Final Length at Break Per cent	Sulphur Coefficient	Tensile Strength, Lbs. per Sq. In. at Break	Final Length at Break Per cent	Sulphur Coefficient	Tensile Strength, Lbs. per Sq. In. at Break	Final Length at Break Per cent	Sulphur Coefficient	Tensile Strength, Lbs. per Sq. In. at Break	Final Length at Break Per cent	Sulphur Coefficient	Tensile Strength, Lbs. per Sq. In. at Break	Final Length at Break Per cent	Sulphur Coefficient	Tensile Strength, Lbs. per Sq. In. at Break	Final Length at Break Per cent
30	0.794	....	....	1.126	545	1180	1.005	....	....	1.434	540	710	0.913	(1)	1210	1.603	2210	820
45	0.856	279	1250	1.317	1019	1170	1.055	306	680	1.490	1366	770	1.063	(1)	1360	1.912	2381	780
60	1.038	....	....	1.583	1228	1120	1.207	592	750	1.638	1819	770	1.335	(1)	1260	2.297	2442	790
75	1.090	494	1220	1.898	....	....	....	....	....	....	1968	750	1.609	533	1230	2.623	....	....
90	1.531	709	1150	2.482	1621	1060	1.558	1041	760	2.382	2350	720	1.953	789	1230	2.962	2730	830
120	2.089	871	1180	3.351	2046	1100	1.765	1815	780	2.801	2808	780	2.496	1053	1210	3.755	2699	770
150	2.236	1159	1130	4.033	2410	1100	2.237	1950	760	3.266	2721	770	3.109	1303	1150	4.521	2619	750
180	2.470	1521	1130	4.939	2670	1030	2.620	2032	760	4.226	2663	740	4.027	1779	1110	5.357	2020	690
210	3.179	1842	1100	5.264	2566	970	3.340	2184	760	4.806	2245	700	4.730	2021	1080	6.379	1118	530
240	3.751	2124	1060	6.268	2131	910	3.615	1978	730	5.564	1837	660	5.624	2362	1050	7.079	754	440

(1) Test pieces did not break.

tures A and C as controls, the excess sulphur coefficients were plotted against their times of vulcanization. A comparison of the curves for B and D show that, when judged by sulphur coefficients only, the activity of aniline as an accelerator is increased in the absence of zinc oxide[1]. On the other hand, a comparison of B-1 and D-1 shows that diphenylthiourea is approximately twice as active in the presence of zinc oxide than when this substance is absent from the mixture. In fact, the difference between curves for B-1 and D-1 is so great that our results indicate the formation of a new and more active accelerator than the original diphenylthiourea, or its decomposition products. It is not impossible that the decomposition products of diphenylthiourea react with the zinc oxide in the presence of sulphur to form varying amounts of a zinc salt of a dithiocarbamic acid. Salts of the latter type have already been mentioned as violent accelerators. On the other hand, the fact that the curve for Mixture D, which contains aniline and zinc oxide, falls below that of B, which contains aniline but no zinc oxide, argues against the formation of diphenylthiourea (and the subsequent formation of the zinc salt of its decomposition or conversion products) from the aniline originally present in the mixture.

The preceding observations are probably applicable to mixtures of the same general type and composition as employed in the course of this work only.

Conclusions

(1) In a rubber-sulphur mixture, the activity of aniline in the acceleration of vulcanization is much greater than that of a molecularly equivalent quantity of diphenylthiourea.

(2) In mixtures which contain zinc oxide, diphenylthiourea is more active than aniline.

(3) In mixtures accelerated by aniline, either with or without zinc oxide, the same maximum tensile strength is obtained, accompanied by a higher sulphur coefficient in the absence of zinc oxide than when this substance is present.

(4) Mixtures which contain zinc oxide, and which are accelerated by either aniline or diphenylthiourea, show large increases in tensile strength in the early stages of the vulcanization.

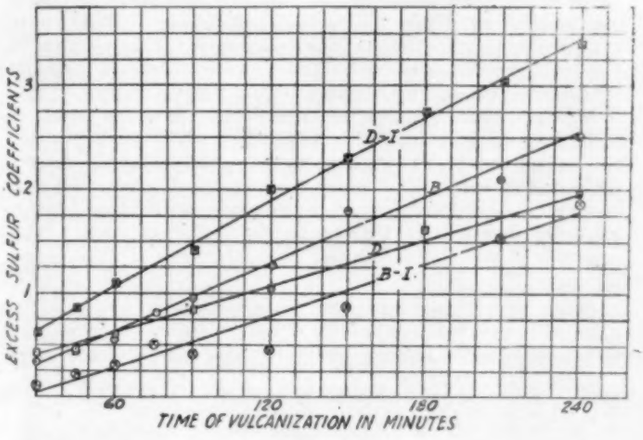


FIG. 2

(5) Mixtures which contain zinc oxide and which are accelerated by either aniline or diphenylthiourea, attain the same maximum tensile strength at approximately the same sulphur coefficients.

(6) There is apparently no general relation between the physical properties and sulphur coefficients of accelerated mixtures.

[1] The sulphur coefficients and physical properties of Mixture D were less concordant than those of any of the other mixtures.

Rubber Exports from Java

The exportation of plantation rubber from Java and Madoera amounted to 17,311 tons in 1918, as against 18,843 and 13,944 tons in 1917 and 1916, respectively. In 1918 Singapore imported 7,551 tons, as against 1,728 in 1917 and 2,077 in 1916. The United States formerly the chief buyer, took but 5,844 tons in 1918, as against 14,840 tons in 1917 and 8,217 tons in 1916. From the outlying possessions the United States imported 7,646 tons in 1918, about one-half of the amount for 1917, which was 14,805 tons. Great Britain's trade likewise fell from 3,848 tons in 1917 to 1,895 tons in 1918. Singapore imports rose abruptly from 7,059 tons in 1917 to 16,485 tons in 1918. Considerable shipments were sent to Singapore, where the rubber was warehoused, awaiting a favorable opportunity for reshipment. The signing of the armistice restored favorable prices: 1 florin ($0.402) per ½ kilo for prime qualities and 0.87½ florin ($0.352) per ½ kilo for parcels containing 75 per cent of these qualities.

On November 15, 1918, the Rubber Producers' Union was formed at Batavia in order that united action might in the future be possible in marketing the colonial rubber.

Zinc Oxide and Tire Life

Few motorists realize the economy derived from the use of long lived tires. Remarkable mileages have been published for tires but in most instances, such mileages have generally been obtained under conditions of continuous service initiated shortly after manufacture and not under intermittent operation over a long period, such as is encountered in the normal operation of motor vehicles. While the automobilist has probably considered the relative merits of the mechanical features of his machine, up to now he has not been equipped to consider the relative merits of the elements entering into the construction of his tire.

In analyzing the value of a tire the first item for consideration is the shoe, since tire failures primarily result from weaknesses in the shoe's construction or the elements entering into its construction.

In its simplest form, a shoe is essentially a rubber sheathing made to resist wear, strengthened by a reinforcement of fabric or cord. Since refined crude rubber has few of the qualities that would fit it for service requirements, the tire maker must compound it with fillers which make it more suitable for use.

Long experience has proved that zinc oxide is an essential filler because it imparts the physical properties necessary to make rubber adaptable for tire use, and that these properties are maintained under long service conditions. First, it increases the tensile strength, thus making possible the high air pressures which are carried. Second, it increases its resistance to abrasion, permitting long use with minimum wear. Third, it increases the toughness, eliminating the cracking which results from road stones and other causes. Fourth, it prevents the rubber from cracking and splitting due to aging. And, fifth, under service conditions, the mixture of zinc oxide with rubber does not heat up to a point where the mixture loses its strength, abrasion resisting properties, and toughness. When long life is considered, the last two points are of vital importance.

Other fillers have been used to some extent, but, while in some instances the results first obtained appeared to warrant their use, when the factors controlling long life were considered, their seeming advantages were overbalanced by zinc oxide. The particles of the other compounds working on each other under service, heat the rubber to such a temperature that the mixture becomes brittle. Its toughness is reduced, its strength is lowered and the rubber separates from the reinforcement, thus causing blow-outs, and cracking.

Motorists whose tires have scaled from overheating would do well to examine the material in the region of the scaling. They will find it is easily broken off with the fingers. After the rubber has once been heated to this point, it does not recuperate and regain its former properties. Moreover, the mixture of rubber with these other fillers does not maintain its physical properties when permitted to stand. The rubber loses its toughness, becomes very brittle, the abrasive resistance is lessened and the tensile strength is rapidly reduced. The resulting tire, therefore, instead of retaining its original qualities, becomes progressively weaker as time goes on even when not in use.

An interesting test was made about a year ago by a rubber company of Akron, Ohio, which gives some idea of the desirable properties exhibited by a tire containing the proper proportion of zinc oxide. The test was conducted over a ten mile stretch of road covered with snow and ice.

One of the wheels of the car was equipped with a zinc oxide tire while the opposite tire contained none of this material. When the car returned from the test a careful inspection of the tires was made. It was found that the tire containing zinc oxide had withstood the test without a blemish while the other had been badly cut.

The color of the tire is more or less due to the filler used. As zinc oxide is white, the resulting tire is usually white or light gray, but color is not always a certain indication, since zinc oxide, because of its recognized value, is utilized, in restricted percentages, as a filler in many black tires.

The buyer is the ultimate arbiter. What he demands the maker will perforce supply. If he takes what is offered without question he will get what is easiest and cheapest to make. If he demands a zinc tire, he will get a zinc tire and his money's worth in service and satisfaction.

The Proper and Improper Vulcanization of Inner Tubes

By Arthur E. Friswell

The true measure of the proper elasticity in an inner tube is the stretch to break and the recovery from a stretch 60 per cent to 70 per cent of breaking strain, tensile, upon which so much stress is foolishly laid, is a secondary consideration. It is always possible to secure greatly increased temporary tensile strength either by increasing the vulcanization beyond the limits imposed for long life, or by using an excessive amount of what are loosely termed accelerators. Now let us see what happens when temporary tensile strength is thus artificially increased for a sales argument only, because it is not a service argument.

Given a compound containing 90 percent to 95 percent rubber by volume, with 3 percent sulphur, and not more than 0.50 percent of hexamethylenetetramene as an accelerator, (one of the most used), if properly vulcanized, a tube of this quality should stretch from 2 inches to 12 inches, (The Bureau of Standard test), and be so held for ten minutes. Then allowed to recover for ten minutes, the stretch remaining over the original 2 inches should be about 10 percent or 2 inches. Tensile strength should be about 2000 pounds to 2200 pounds per square inch. Now to increase this tensile by vulcanizing to 2600 or 3000 pounds, what happens? The stretch may not be affected immediately and perhaps not even for six months, but it is a foregone conclusion that such a tube will crumble and die soon after six months, and very likely earlier. When the recovery from stretch shows, (as in the case of much advertised high tensile tubes), only 2½ percent to 5 percent, there is something radically wrong. The tube is doomed to a young untimely death. If excessive tensile strength is secured, (as it often is), by using as high as 1½ percent to 2 percent of the accelerator mentioned, the result is even worse.

Such tubes probably will not last three months. Overvulcanizing or the use of an excessive amount of so called accelerators, which are really catalysers and like poison, to be used in very small doses, give very pretty attractive first effects, which are really about as wholesome as the hectic flush of one in the last stages of tuberculosis. Such tubes are translucent, smooth, free from all bloom or sulphur deposit, very, very attractive indeed, but good only for the show window, or the salesman's grip; absolutely no good at all for long service. Take an extreme case, the tensile strength of such a compound as given may be increased to 4000 pounds if the vulcanizing is continued until hard rubber is secured. It can easily be seen that while this material is all right for pipe stems, etc., it is scarcely the thing for an elastic tube, and here endeth the tensile lesson.

The South American Rubber Industry and the Market for Rubber Goods

Interest is ever increasing in the countries of South America and the markets they offer to the manufacturers and the exporters of the United States. The following information issued by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce, Washington, D. C., gives an insight into what these countries need in the way of manufactured rubber goods.

Argentina

[Vice Consul Harold G. Waters, Buenos Aires.]

The rubber industry in Argentina has not progressed to a very great extent. Argentina is primarily a pastoral country, and all manufacturing is greatly handicapped by the lack of fuel and electric power. However, there is promise of advancement in this important industry, as shown by the growth and successful development of the business enjoyed by the three factories already established in Buenos Aires.

Of the three concerns producing rubber manufactured articles for this market, only two are manufacturers to an extent worthy of consideration. The two more important firms have been operating since about 1900. They were encountering many difficulties until the war caused a cessation of shipments of rubber goods to this market by European manufacturers and consequent increased demand for the local products. A great deal of anxiety is felt by the local manufacturers regarding rumors that German and other competition, with long term credit and low prices, will soon enter this market in an effort to recuperate the business enjoyed before the war.

The total amount of crude unrefined rubber imported in 1910-1914 was 237,639 pounds; 1914, 53,853 pounds; 1915, 73,499 pounds; 1916, 139,698; 1917, 163,426 pounds; 1919, 404,539 pounds; in first nine months of 1919, 199,232 pounds; in first nine months of 1918, 289,205 pounds.

Market for Rubber Tires

The market conditions for rubber tires in Argentina are very favorable. The demand for American-made tires is steadily increasing, owing to the popularity of American automobiles. In Buenos Aires competition is very keen, as there are represented 20 foreign manufacturers, 12 of the United States, 5 of Great Britain, 1 of Italy, and 2 of France. All of these concerns have their Argentine headquarters in Buenos Aires, with their organizations extending to all the leading cities throughout the Republic. In Buenos Aires they retail their products directly to the customer and also wholesale to the smaller dealers.

Although American-built automobiles are gaining in popularity in this country, there is in use at the present time a majority of European-built cars, and therefore the market is mostly a millimeter (millimeter=0.039 inch) tire market. Beaded edge millimeter tires, beaded edge inch tires, straight-side inch tires, and a limited quantity of quick detachable clincher inch tires are demanded by the buyers here.

The sizes used in the millimeter tires are 815 by 105, 875 by 105, 880 by 120, 815 by 120, and 920 by 120, given in the order of their importance. In the beaded-edge inch fabric tires 30 by 3, 30 by 3½, 31 by 4, 32 by 3½, 33 by 4 and 34 by 4 are the principle sizes, in the order of their importance. The straight-side inch market is said to be improving due to the influx of American cars, the sizes generally used being 32 by 3½, 32 by 4, 33 by 4, 34 by 4, 34 by 4½, and 35 by 5, with their respective oversizes, both in cord and fabric tires. In the quick detachable type tire the sizes 34 by 3½, and 35 by 5 are supplying the greatest demand. Outside of the 30 by 3½ size the beaded-edge inch-size tires are sold only in the fabric type. There is no demand for cord tires other than for the 30 by 3½ size. There is a steadily growing demand for cord millimeter tires and many United States manufacturers are now making this style for the Argentine market. It is the opinion of local dealers that more European automobiles will be imported in the future, and for tires for these cars American manufacturers will find it necessary to produce millimeter sizes if they wish to compete with European manufacturers who are already equipped with machinery for such sizes.

Buenos Aires has the only factory in the country producing pneumatic tires for automobiles and bicycles. This concern also produces inner tubes for automobiles and bicycles.

Imports of Tires

Below are given official statistics of imports of tires by countries of origin. In these statistics rubber tires used by carriages and coaches are included with automobile tires, and it is impossible, therefore, to give a separate table on the importation of the latter. Automobile tires form, however, probably 85 per cent of the total.

Imported from—	1910-1914	1913	1914	1915	1916
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*
Germany	393,135	147,773	52,410	888	.....
Austria-Hungary	705	.....	.....	.....	.....
Belgium	5,968	2,586	198	.....	.....
Spain	4,751	3,086	.....	.....	.....
United States	119,464	35,263	15,565	10,986	77,448
France	45,507	20,867	1,442	14,932	23,376
Italy	62,375	29,533	30,203	.....	33,001
United Kingdom	536,327	139,186	47,002	65,790	132,791
Chile	.....	.....	.....	.....	53
Switzerland	.....	.....	.....	474	.....
Total	1,168,232	378,294	131,549	108,341	266,669

The total quantity imported in 1917 was 128,704 pounds; in 1918, 168,519; in first nine months of 1918, 108,097; in first nine months of 1919, 161,504.

Classification of importation by countries is not available since 1916.

The above figures do not indicate the proportion of American tires imported at present, which is probably 50 per cent of the total.

Demand for Rubber Boots and Shoes and Rubber Goods for Industrial Purposes

Argentina is not a very promising field for the sale of rubber boots and shoes. Rubber boots are offered for sale by the dealers here, and are used to some extent, but the comparatively warm climatic conditions are unfavorable to the use of rubber footwear. Rubber overshoes are not used to any appreciable extent.

The three local factories manufacture rubber goods for industrial purposes, including rubber belting, sheet packing, cold-water hose, steam hose, pressure hose, washers, lined washers for ammonia compressors, cheap quality sheets for sugar centrifugals, and various kinds of rubber connections.

There is an active demand for rubber hose in the wine-producing sections of the country, and the local companies enjoy a good business in rubber hose for this industry, and also in the sale of rubber garden hose, which is produced and sold in large quantities throughout the Republic. The three local factories produce hose for every demand, and in all sizes. The output does not supply the demand, however, and hose is imported from the United States, England, and Germany.

The total quantity of rubber hose imported in 1910-1914 was 4,410,148 pounds; in 1914, 607,756; in 1915, 363,195; in 1916, 549,039; in 1917, 484,212; in 1918, 256,746; in first nine months of 1918, 173,704; in first nine months of 1919, 450,312.

Rubber horseshoes find a good market in the city of Buenos Aires. The use of horseshoes with cleats is prohibited, and only flat-surface shoes can be used, the streets being paved with wooden blocks or asphalt. Rubber shoes have been found very practical and are in demand here. It would be advisable for any concern intending to manufacture rubber horseshoes for this market to follow models of those at present used in this

country. The models now in use have given satisfaction, and it is much easier to follow established preferences than create new ones.

Other Rubber Goods

Insulated wire and cables are made by a local company. The copper strands are imported from Europe and the United States and insulated and finished here. The factory has just been established and is not yet producing to any great extent.

Hard rubber goods, or ebonite, as it is called here, can not be successfully manufactured in Argentina. The antiquated systems of vulcanizing and the difficulty found in polishing the surface of this class of rubber goods make its manufacture unprofitable for local factories. There are so many other articles of rubber which can be manufactured more easily and more profitably that the factories do not produce hard rubber goods. Friction tape manufacture has experienced much the same result as that of the hard rubber goods. High cost of raw products makes the production of this article prohibitive.

Druggists' sundries have been manufactured by three or four specialists in Buenos Aires, and are now manufactured to a limited extent. Foreign competition has proved too strong for the local manufacturers of this line of goods, however, and production is hardly worthy of consideration. The Japanese have sold druggists' sundries in this market at very low prices, and at present enjoy a fair trade.

Rubber toys are manufactured here to a small extent. Before the war the majority of these goods came from Germany, and although Germany is not at present in the market, it is believed that it will soon be in a position to make deliveries.

Brazil

[Consul A. T. Haeberle, Rio de Janeiro.]

Rubber goods for industrial purposes are manufactured by Cia. Industrial Brazileira de Borracha, Borrogain & Cia.; they also manufacture rubber soles and heels. There are two or three smaller concerns in Rio de Janeiro that manufacture rubber heels and other minor articles. An American company is awaiting material to construct a factory in Rio de Janeiro. Its intention is to commence the manufacture of rubber tires, heels, and soles during the coming year (1921) and other products later on as work is completed on the factory.

Demand for Rubber Tires

The most popular type of tire used is the clincher, due to most of the automobiles here being of European make. However, since the war American cars have been imported in large quantities and straight-side tires are being sold in increasing quantities. Quick detachable tires are seldom used. The most important sizes in millimeters (millimeter=0.039 inch) are the following: 105 by 815; 105 by 875; 120 by 820; 120 by 880; 120 by 920; and in inches: 3½ by 30; 3½ by 32; 4 by 32; 4 by 34; 4½ by 33.

Tires are imported from the United States, France, England, Italy, Belgium, and Germany. The branch offices sell only to dealers, who in turn sell to garages and to the consumers. Agencies sell to dealers, garages, and the consumers. The terms of payment vary. Retailers are allowed from 10 to 40 days' credit, according to their financial standing.

Importation of tires and inner tubes and solid tires for trucks from various countries during 1918 and 1919 was as follows:

Articles and countries.	1918	1919
Tires and inner tubes:	*Number.*	*Number.*
United States	319,019	821,819
France	104,195	222,010
Great Britain	111,375	120,431
Italy	102,785	87,231
Solid tires for trucks:		
United States	6,624	67,440
Great Britain	51,468	55,673

It will be noticed that the United States led in exportation of tires to Brazil by a large margin in 1919. However, future calculations can not be based on these figures, as this overwhelming lead was gained by the United States only because the other countries were unable to turn out the usual number of tires.

It might also be stated that the tire most sold is the French make, Michelin. The reason for this is that it is sold from 20 per cent to 30 per cent cheaper than American tires. Information has also been obtained that the German Continental tire will be able to compete in price with the Michelin. This tire was widely used before the war. It will therefore be seen that if any American concern could produce a good cheap tire, it would be advantageous to bring it into the Brazilian market.

Market for Rubber Boots and Shoes

Rubber shoes are either imported by the retailer or by wholesalers who sell them to the trade. All rubber shoes sold here come from the United States. An American company does an indent business in this line, viz, sales are made by its Rio de Janeiro branch and orders sent to the New York office. These orders are then filled by the New York office and shipments made consigned direct to the customer either on sight draft or up to 90 days' credit, payments being made direct to the New York office.

There is no market for rubber boots in Rio de Janeiro. They are only imported by an American rubber company upon request, or imported direct by the consumer or some concern as a favor to the consumer. Shoe stores in Rio de Janeiro at various times import direct or do business on indent orders.

Rubber Goods for Industrial Purposes

The information regarding rubber goods for industrial purposes covers the following items, also any other incidental goods in this line not enumerated: Rubber belting; rubber packing (sheet and piston); rubber hose—water hose, steam hose, air hose, beer hose, garden hose, and airbrake hose; rubber washers, etc.

These articles are imported from the United States and England, some also from France and Italy. Belting is also imported from Scandinavia. They are sold by two American rubber companies. These articles are also imported by various concerns that, besides selling to dealers, sell direct to the consumer. Up to 90 days' credit is allowed to importers and 10 to 40 days' credit to dealers.

Other Rubber Goods

Rubber coats are imported from the United States and England and are also manufactured here. Various local concerns import the rubber cloth and manufacture the coats. Most of the raincoats sold are those manufactured here, because they are cheaper.

Insulated wire and friction tape are imported from the United States, Italy, and England. Concerns importing insulated wire and friction tape sell both to dealers and to consumers. Credit is allowed up to 90 days to importers and up to 40 days to dealers.

Imports from various countries of insulated wire for 1918 and 1919 were as follows:

Imported from—	1918	1919
United States	$661,881	$682,469
Great Britain	3,527	13,005
Italy	5,694	26,621

Rubber soles and heels, only recently introduced into Rio de Janeiro, are not yet an established trade. These are imported from the United States and also manufactured here. The local firms sell them to dealers and shoe manufacturers who sell them to the consumer. Some retailers import rubber heels and soles direct. From 10 to 40 days' credit is allowed dealers.

Rubber toys are imported by practically all toy stores. These toys come from the United States, Japan, France, and England. Most of these articles are imported direct by retailers. Credits up to 90 days are allowed importers.

Imports from various countries of rubber toys for 1918 and 1919 were:

Imported from—	1918	1919
United States	5,761	1,861
France	4,529	1,822
England	7,996	5,382
Japan	2,971	2,261

Rubber matting is imported from the United States. Most of the sales of this product have been made to steamship companies to be used aboard ships. One of the disadvantages of this product is that the duties are very high.

Drug sundries and hospital supplies are imported from the United States, France, and England by various concerns that sell them to the trade, and also by salesmen who when selling medicines try to sell these articles at the same time. When any orders are obtained by the latter they are sent to medicine concerns in the United States that, when filling orders for medicines job these goods and send them along. Dealers are allowed 10 to 40 days' credit. Importers are allowed credit up to 90 days.

Peru

[Vice Consul James H. Roth, Callao-Lima.]

Although rubber is raised in Peru and exported in its crude state, yet there are no manufacturers of rubber goods in the country, all articles manufactured of rubber being imported.

Owing to the growing popularity of the automobile in Peru, and to the great increase in numbers of taxicabs, pleasure cars, and motor trucks, the demand for automobile tires has been steadily increasing. Over 1,000 cars of various makes are in use in the city of Lima alone, and many are scattered throughout the various portions of the coast section of the Republic.

In point of numbers the small-sized cars predominate, and hence the size in inches of tire most in use is the 30 by 3 and the 30 by 3½. Also there is a considerable demand for the sizes 32 by 3½, 32 by 4, 33 by 4, 34 by 4, and 35 by 4½. There are in addition quite a number of automobile trucks in use in Peru using solid rubber tires.

Both the quick detachable and clincher rubber tires are used, the quick detachable being the type most in demand.

The great majority of tires are imported from the United States, although some French and English tires are sold. Nearly all of the most popular brands sold in the United States are sold in Peru, being imported by the importing houses and distributed by them to the retailers or garage owners throughout the Republic. Tires are carried in stock by the importers, some of them acting as agents for the manufacturers and others purchasing their stocks outright.

Sales made to the importers by the manufacturers are generally on a basis of cash against documents, or on a credit of 30 days. The importer then either sells to the retailer for cash or places a certain number of tires on consignment, and settlement is made at the end of each month for the number of tires actually sold. This latter method is the prevailing one, although sales on credit are sometimes made.

On account of the duty on tires imported into Peru being charged by unit of weight, all tires imported are shipped wrapped in burlap.

The following table shows the imports of tires into Peru during the years 1913, 1917, and 1918:

Imported from—	1913		1917		1918	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Germany	22,930	$12,637				
Belgium	99	55				
United States	9,285	5,117	72,155	$74,756	133,620	$138,462
France	7,867	4,335	3,742	3,835	3,097	3,208
Great Britain	2,070	1,140	256	267	1,770	1,840
Italy	265	145				
Uruguay	60	35				
Chile					79	37
Japan					456	490
Panama					1,579	1,640
All other countries			157	160	556	575
Total	42,576	23,464	76,310	79,018	141,157	146,252

Demand for Rubber Boots and Shoes Limited

The demand for rubber boots and shoes in Peru is very poor. Owing to the fact that there is practically no rainfall in these coast section of the country, there is very little need for the articles. Most of the rubber shoes worn in Peru are worn by transients, the Peruvians very seldom using them. Rubber boots are used only in the mining sections, except in rare instances, and the mining sections furnish a very small market. Therefore the demand for these two articles can not be said to be general.

There is no separate import classification of rubber boots and rubber shoes, and along with them are classed shoes having rubber soles. Quite a number of these are used in Peru, principally tennis shoes, sneakers, and white canvas shoes, which are quite extensively worn during the summer months. In the mountain country the demand for these rubber-soled shoes is very small, and it is only in and around Lima that they are used. Here the demand for this class of shoe is good.

Very few dealers carry stocks of rubber shoes and boots, as, owing to climatic conditions, it is very difficult to keep them in a good state of preservation for any length of time. These goods are imported into Peru packed in wooden cases and the duty is charged on them according to the unit of weight.

Following is a table of the imports of rubber boots and shoes during the years 1913, 1917, and 1918:

Imported from—	1913		1917		1918	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Germany	1,190	$886				
Ecuador	11	8				
United States	2,979	2,215	27,438	$38,108	17,996	$24,998
France	946	704	373	517	728	1,009
Great Britain	1,911	1,422	433	600		
China			3	6		
Japan			31	44	551	765
Bolivia					4	6
All other countries			30	38	18	26
Total	7,037	5,235	28,308	39,313	19,297	26,804

Good Market for Rubber for Industrial Purposes

During recent years a large number of the sugar and cotton plantations, situated in the coast region of Peru, have begun using machinery quite extensively in their operations. Also the mining industry has increased to a great extent, and in addition to this there are a number of textile mills in operation in the country. In all of these industries belting is a necessity and hence the demand for this article is very good.

The quality of belting that is most in demand at present is known as "balata," the largest users being the textile mills, and about 60 per cent of this kind is imported from England. Of the other kinds of rubber and rubber composition belting, practically all is imported from the United States. Rubber belting proper is very little known and is used principally in pumping installations.

In the extremely warm sections of the country, more leather belting is used than the combination balata and rubber variety, but in practically all parts of the country the latter is in use. In fact, all industries using machinery are compelled to use belting of one or the other kind, and the demand for the rubber and balata combination belting has greatly increased during the past few years and is still increasing. The market for this commodity may be classed as good.

This article, sold by unit of length, is imported into Peru by the large importers and wholesalers, and in some instances, by the users direct. It is packed for shipping in coils, covered with burlap sacking. The terms of sale to the importers by the manufacturers are generally cash against documents, or a credit of 30 days. Considerable stocks are carried by the importers and wholesalers in Lima, and distributed from that city throughout the other portions of the Republic.

Demand for Belting Increasing

The demand for belting of rubber, or into the manufacture of which the rubber enters, is constantly increasing and the market offered in Peru is good.

Washers and packing into the manufacture of which rubber enters are used on all the big steam installations, and the American product is growing greatly in favor.

These articles are sold by unit of weight and are shipped in wooden packing cases. The terms of sale are generally on a basis of cash against documents or on a credit of 30 days. They are imported by the importing houses and wholesalers and distributed by them to the users.

The demand for these articles is increasing on account of the increase in the use of machinery in the different industries of the country. The market may be said to be good.

There are quite extensive telephone and telegraph systems in Peru, and, as has been stated above, there is a great amount

of construction work in progress. In addition to this, the mining industry is of considerable extent, and owing to the fact that all of these industries are compelled to use more or less insulated wire, the possibilities offered in this market are good.

A company has been organized in Peru for the purpose of establishing a long-distance telephone system between Lima and the other cities in the surrounding territory. It is contemplated that this service will gradually be increased to include the entire coast section of the Republic. This project will, of course, create an additional demand for rubber insulated wire.

At present, the actual market may be said to be only fair, being governed by the increase in the operations and additions of the industries using insulated wire.

This article is imported by the large wholesalers and importers and is distributed by them to the retailers and users throughout Peru. The terms of sale to the importers are generally cash against documents, or on a credit of 30 days. Insulated wire is sold by unit of weight and is shipped in coils, covered with sacking. Lamp cord is sold by unit of length and is shipped either in burlap sacking or in kegs or cases.

Rubber Clothing—Miscellaneous Rubber Goods

Rubber clothing is very little used in Peru. There is some demand for rubber coats and capes in the mining section, and while there is practically no rainfall in the coast section, yet during the winter months there are heavy fogs and mists, and for this reason quite a number of raincoats of rubber composition are worn. There are practically no pure rubber raincoats, and the ones that are worn are worn by foreigners or transients. Some few small stocks are carried by the retail houses, but the demand for this article is very small.

The market for miscellaneous rubber goods, such as toys, matting, friction tape, druggists' supplies, etc., is steadily increasing. Practically all of the retail houses in Peru that handle household articles, druggists' supplies, novelties, toys, etc., carry at least some articles manufactured of rubber, or into the composition of which rubber enters, and owing to the fact that the different countries of Europe and the Americas are exporting goods of this nature to Peru, the field for this class of commodities is exceptionally good, and the trade is steadily increasing.

Following is a table of imports of miscellaneous rubber articles for the years 1913, 1917, and 1918. Many articles other than the ones enumerated are imported into Peru, but it is impossible to obtain a list of them for the reason that they have no separate classification.

Imported from—	1913		1917		1918	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Germany	6,145	$5,000	.....	.....	.....	.....
Belgium	1,365	1,128	.....	.....	.....	.....
United States	5,480	2,870	16,905	$33,539	15,276	$30,307
France	5,258	4,346	1,360	2,698	.....	.....
Great Britain	4,720	3,900	1,538	3,145	1,867	3,704
Italy	177	145	232	459	.....	.....
Japan	177	145	1,777	3,525	7,890	15,658
All other countries	23	50	155	216	1,467	2,909
Total	21,345	17,664	21,967	43,582	26,500	52,578

The same houses handle belting, packing, hose, washers, insulated wire, etc. These firms carry a general line of this class of goods and are all located at Lima, which is the center through which distribution is made. Stocks of these articles are carried by the wholesalers and importers, both in Lima and Callao, and in addition to this, orders are taken from the users by them and sent in to the manufacturers.

Many sales are made on a 30-day credit basis, and there have been sales where even a longer credit is extended. The American manufacturers, however, seem to prefer the strictly cash basis.

The market for rubber goods offers great possibilities as their use is becoming more and more general all the time. The United States has enjoyed the greater part of this trade for the past several years, but as the European nations are recovering from the effects of the World War, competition will become more active.

Venezuela

[Vice Consul George R. Phelan, Puerto Cabello.]

There are no manufacturers of rubber goods of any kind or journals devoted to the rubber industry in the Puerto Cabello consular district.

The prospect of importation of pneumatic rubber tires is very good in this district, as the use of automobiles is increasing rapidly, due to the great improvement of local and national roads throughout the country.

Regarding general conditions of this market, it may be stated that the terms of payment vary according to the conditions made by each foreign exporter. Though some of them require payment on delivery, yet the most usual term of payment is 90 days sight. There are no special methods of distribution. All the merchants of this district are retailers.

The sizes in inches generally used are: 30 by 3, 30 by 3½, 31 by 4, 32 by 4, and 34 by 4. The two former sizes are much more used than the others. The quick detachable type is the most popular.

The direct importation of rubber tires to this port is still very limited, almost all pneumatic tires used in this country being imported through the port of La Guaira by agents and firms established at Caracas that appoint subagents and supply firms in the principal outlying cities and towns.

Statistics of Importation of Rubber Tires

During the year 1913 the importation of rubber tires amounted to only 515 pounds of a value of $501, all imported from the United States. It must be stated that a great part of rubber tires imported in that year was probably not pneumatic tires, but plain for cabs and other vehicles drawn by horses.

The statistics for 1917 showed a total importation of rubber tires amounting to 15,154 pounds, valued at $12,921. The greatest part was imported from the United States and the rest from Great Britain.

In 1918 the total importation of this article was only 3,777 pounds of a value of $4,470, all imported from the United States. The considerable drop in the amount of importation during that year was due to the great difficulties experienced by importers in securing this kind of goods.

For 1919 the statistics are at present available only for the first six months. During that period 6,244 pounds of rubber tires, valued at $7,013, were imported from the United States and 920 pounds, valued at $531, from Great Britain, giving a total of 7,164 pounds, valued at $7,544, or nearly twice the amount of total importation of this article for 1918. It is thought that the importation of the same article during the last six months of the same year was still more important.

Market for Rubber Boots and Shoes—Other Rubber Goods

This is not what might be called a market for rubber boots and shoes. The demand for these articles is very small. They are occasionally brought from Caracas or imported directly by individuals for their own use. The same statement may be given regarding the importation and use of rubber goods for industrial purposes.

The market conditions for other rubber goods, such as rubber clothing, insulated wire, soles and heels, toys, tubes, and articles included under druggists' sundries, are not of great importance. The term of payment generally required by foreign exporters is of 90 days. Before the war, the United States and Germany were the principal sources of supply for these articles, but since the outbreak of the war these goods have been imported almost exclusively from the United States.

Slackening of Russian Industries

Although it is known that manufacturing in Russia has fallen off to a mere shadow of what it formerly was the gathering of accurate statistics upon the subject has been difficult owing to the existing conditions in that country. Recently figures were issued by the secretary of the Italian Metal-workers Association showing the reduction of the number of hands employed in various large Russian works. Among the firms mentioned was the Treugolnik rubber works which before the war employed 20,000 men. The present number employed is only 5,000.

Rubber Goods in Australasia

Australian manufacturers of rubber goods, according to the Bureau of Foreign and Domestic Commerce, have increased considerably of late year and with the advantages given to the industry by the tariff act of March, 1920, there is every indication that the country will continue to produce a larger proportion of its own requirements. The raw material heretofore secured from the Straits Settlements, Ceylon, and Java is now being brought in larger quantity from island territories that have come under Australian political control.

On June 30, 1919, there were 14 establishments in New South Wales engaged in the production of rubber goods, employing 771 hands, an average of 55 persons per factory.

Particulars of imports of manufactures of rubber. such as rubber hose, bandages, elastic stockings, soles and heels, rubber-tire fabric. tires and tubes, stoppers and corks, into New South Wales are as follows:

Imported from—	1913	1917-18	1918-19
United Kingdom	$445,557	$257,554	$283,434
Germany	225,956		
United States	168,372	813,089	118,900
Canada	79,713	475,664	11,795
Italy	82,213		
Other countries	23,137	96,170	40,074
Total	1,024,948	1,642,477	454,203

Imports of rubber, such as crude rubber, rubber waste, hard rubber in sheets, syringes, air cushions, etc., were:

Imported from—	1913	1917-18	1918-19
United Kingdom	$121,146	$158,949	$11,842
Straits Settlements	123,983	95,743	22,005
United States	6,622	17,456	
Other countries	15,677	220,575	317,336
Total	267,428	492,723	351,183

Other imports of rubber for the years 1917-18 and 1918-19 were:

Articles and countries.	1917-18	1918-19
Rubber overshoes:		
United Kingdom	$64,485	$73,986
United States	57,361	53,154
Canada	23,208	94,747
Other countries	6,999	260
Total	152,053	222,147
Gum and wading boots:		
United States	5,849	9,239
Canada	4,860	16,262
Other countries	3,126	1,540
Total	13,835	27,041
Rubber belting:		
United Kingdom	3,114	9,034
Rubber belting—Con.		
United States	$24,517	$34,687
Canada		8,735
Other countries		1,676
Total	27,631	54,132
Rubber tires and tubes, including solid tires:		
United States		1,054,225
Canada		498,072
United Kingdom		298,104
Other countries		236,901
Total		2,087,302

In the foregoing tables the values of imports in pounds sterling during the year 1913 and 1917-18 have been converted at the rate of $4.8665, and for the fiscal year 1918-19 at the rate of $4.76.

Market for Rubber Tires

Probably 40 per cent of the motor car tires used in New South Wales are of American manufacture. The largest part of the automobile trade is in the hands of the Dunlop (Australasia) Co., which is now able to produce a high-grade tire and, because of the exchange situation, the higher export costs of of American goods and the added customs duty, to extend the sale of its products, particularly in 3½-inch size tires, against all competing makes of imported goods.

American-made tires enjoy a good reputation and have been sold on a quality and wearing basis that has given satisfaction to users. Considerable local advertising is done by American tire exporters, supported by demonstration and technical service. Dealer organization as it exists in the United States has not yet been developed in New South Wales, and foreign manufacturers must therefore keep up an unremitting effort to move their goods.

In types there is a larger demand for clincher than any other type, but owners of cars are turning, it appears to straight-side tires. Australian manufacturers are apparently interested in developing the use of straight-side tires, and imports of this type from the United States will probably increase.

The general situation in the motor-tire trade is, just now, rather against much more development in sales of American or British products. Australia is probably about to enter upon a period of increased manufacture and adopt the newest methods to reach consumers.

Market for Rubber Boots and Shoes and Other Goods

Statistics show a growing demand for rubber boots and light overshoes and that the United States supplies about a quarter of the total imports. Canadian manufacturers, or the Canadian factories of American concerns, are increasing sales here.

Rubber belting is one of the chief lines imported from the United States and there seems to be a good prospect for increased business, although local manufacturers are improving their product to meet special industrial requirements. In all miscellaneous rubber goods the general import trade is very slow.

Importers generally prefer to do business with the manufacturer and are making new connections in this respect in order to save jobbers' and commission men's profits. Terms are usually cash against documents Sydney.

Market Demands in South Australia

[Consul Henry P. Starrett, Adelaide.]

There is no manufacture of rubber goods in South Australia, and no trade publications devoted to this subject are published here.

The extent of the market for rubber tires may be gauged by the number of motor cars, trucks, and motor cycles in actual operation in South Australia. At present there are 10,923 motor cars, 679 motor trucks, 12 tractors, and 7,890 motor cycles in use. The growth of the market may be appreciated by the number of new registrations each year. These were, for 1915, 1,815 motor cars; 1916, 1,466; 1917, 1,985; 1918, 2,111; and 1919, 3,114.

Approximately one-half of the tires used in this state were made by British companies in New South Wales and Victoria. The total importation during the fiscal year of 1918-19 amounted to $429.936. of which the United States furnished 42 per cent., Canada 24 per cent., France 17 per cent., the United Kingdom 11 per cent., Italy 6 per cent., and Japan less than 1 per cent.

The largest demand is at present for the clincher type, although the popularity of the straight-side tire is growing very fast. There is very little demand for the quick detachable type. The most popular sizes in the order of their sales are: 30 by 3½ inches, 33 by 4 inches, and 815 by 105 millimeters (millimeter=0.039 inch). British and continental tires are sized in millimeters and American in inches.

Most of the large rubber companies, both domestic and foreign, distribute their goods through sales agents who secure orders from the wholesale accessory and motor car dealers and the goods are in turn by them distributed to small dealers and garages.

Rubber Boots and Shoes and Mechanical Rubber Goods

England has always maintained its position as the largest supplier of rubber boots and shoes, furnishing during the last year nearly 95 per cent. of the total importation. Heretofore American supplies of these goods have been negligible, but it is stated that a certain large American manufacturer has recently established selling agencies throughout Australia with the intention of securing a share of the trade in these and other rubber lines. Sales are made through the ordinary wholesale distributing channels.

Three Australian companies—the Dunlop, Barnett-Glass, and the Perdriau—supply the bulk of the mechanical rubber goods demand. Four American companies furnish most of the import trade, but meet with keen competition by an English company producing rubber belting, as well as certain high grades of English packing which is largely in favor with the trade. It is stated that the locally made packing is not as high in quality as some of the English and American productions.

Druggists Sundries—Sales Methods and Statistics of Importation

At least one Australian company manufactures a very good line of these sundries which is meeting with increasing favor among local buyers. The best lines of these goods, however, are usually of English production. A local druggist remarked that his customers do not like the American style of making up these goods with unnecessary ornamentation, extra reinforcing, ribbed, or of red black rubber. The demand is for plain white goods, with reasonable reinforcement at the edges. Tubing should be of plain and white rubber, not red and ribbed.

All of the above goods are distributed in much the same way as they are in the American home market, imports coming to wholesale houses and then distributed to local dealers. Usual terms are 30 days sight draft with bill of lading attached, specific instances varying from cash against documents in New York or London up to 60 days sight draft with bill of lading attached. Usual terms between wholesale and retailers are 30 days net.

Customs statistics showing the importation of the above goods into South Australia for the calendar year 1913 and the fiscal years (ended March 31) of 1917-18 and 1918-19, the pound sterling having been converted at the rate of $4, are shown in the following table. These statistics, however, do not reflect the true extent of the market for the reason that they deal only with goods actually imported into the state from overseas countries, whereas considerable quantities are, in practice, entered at Sydney and Melbourne and thus lose their indentification with the South Australian customs report.

Articles imported and countries of origin.	1913	1917-18	1918-19
Boots and shoes of rubber:			
United Kingdom	$15,400	$13,432	$15,924
Canada	1,268	1,220	460
Norway	742	.....	16
United States	224	.....	.....
Total	17,634	15,652	16,400
Belting, rubber:			
United Kingdom	13,560	3,420	6,228
Canada	796	.....	96
United States	8,640	2,548	41,208
Total	22,996	5,968	47,532
Cables and wire, covered:			
United Kingdom	200,444	2,120	41,064
Belgium	444	.....	.....
Germany	3,884	.....	.....
Japan	.....	9,988	43,564
United States	396	5,496	30,496
Total	205,168	17,604	115,124
Packing, asbestos, and other:			
United Kingdom	9,292	4,108	10,396
Canada	96	260	2,096
Germany	3,600	.....	.....
United States	3,180	2,800	5,140
Total	16,168	7,168	17,632

Articles imported and countries of origin.	1913	1917-18	1918-19
Rubbered waterproof cloth:			
United Kingdom	$4,112	$600	$1,636
Germany	300	.....	.....
United States	48	1,256	21,124
Total	4,460	1,856	22,760
Rubber, manufactured articles of n. e. i.:			
United Kingdom	106,764	76,424	51,132
Canada	38,344	11,608	2,844
France	10,712	28	28
Germany	25,996	.....	.....
Italy	8,708	64	.....
Japan	100	1,676	808
United States	36,408	84,164	20,532
Total	227,032	173,964	75,344
Rubber tires and tubes:			
United Kingdom	(1)	(1)	47,492
Canada	(1)	(1)	102,548
France	(1)	(1)	79,524
Italy	(1)	(1)	25,504
Japan	(1)	(1)	3,728
United States	(1)	(1)	171,140
Total	(1)	(1)	429,936
Grand total	493,458	222,212	724,728

[1] Included in rubber manufactured articles above.

New Zealand an Important Market

[Consul General Alfred A. Winslow, Auckland.]

No rubber is grown in this Dominion for commercial purposes, and it is not probable that any will be grown here in a commercial way for years to come, if ever. Neither are there any journals devoted to the rubber business published here.

The imports of rubber supplies for 1913 compared with 1918 and 1919 are not given in this report for the reason that the classification for 1913 does not correspond with that of the years following. There are given herewith the figures for 1914, which is the first year under the new classification.

Constantly Increasing Demand for Rubber Tires

There is a large number of rubber tires imported into New Zealand annually, and the demand is constantly increasing. The present source of supply is very largely from the United States, while previous to the war the United Kingdom supplied the greater portion of rubber tires in this Dominion, as shown by the following table the normal rate of $4.8665 per pound sterling having been used in making all conversions in this report:

	1914	1917	1919
Rubber tires, covers, and tubes for bicycles and tricycles:			
United Kingdom	$66,067	$64,597	$71,590
Australia	60,939	191,379	140,321
France	7,718	16,498	4,939
Germany	7,757	.....	.....
Japan	.....	6,882	49,156
United States	5,256	1,809	2,263
All other countries	1,688	682	1,076
Total	149,425	281,847	269,345

	1914	1917	1919
Rubber tires, covers, and tubes for motor bicycles and tricycles:			
United Kingdom	126,315	41,313	27,447
Canada	.....	.....	189
Australia	130,071	50,519	39,541
France	13,295	9,649	.....
Germany	5,089	.....	.....
Japan	.....	369	.....

	1914	1917	1919
Rubber tires, covers, and tubes for motor bicycles and tricycles—			
Con. United States	$3,528	$45,351	$42,829
All other countries	1,189	.....	19
Total	279,487	147,201	110,025
Rubber tires, covers, and tubes for motor cars, trucks, etc.:			
United Kingdom	315,125	316,493	320,950
Canada	3,859	147,007	562,323
Australia	242,633	370,077	637,341
France	68,856	78,863	454,892
Germany	337,317	.....	.....
Italy	183,701	159,889	234,531
Japan	.....	.....	243
United States	124,878	1,116,565	1,975,143
All other countries	4,872	.....	.....
Total	1,281,241	2,188,894	4,185,423

Rubber tires are distributed either through an agency under control of the manufacturer located in one of the centers of this Dominion, or a New Zealand agency that handles the business for the entire Dominion. This is the general rule, but there are some cases in which tires are sold to individual firms direct from the United States.

All sizes of tires are in use, but those in most general use are the following: 30 by 3½ inches; 32 by 3½ inches; 33 by 4 inches; 36 by 4½ inches; 855 by 105 millimeters; 875 by 105 millimeters; 920 by 120 millimeters.

Rubber Boots and Shoes

There are comparatively few rubber boots used in the Dominion, but galoshes and overshoes and rubber shoes for gymnasiums are in quite general use as shown by the following tables giving the imports by countries for this class of goods for 1914, 1917, and 1919:

Articles and countries	1914	1917	1919
Galoshes, and overshoes of rubber, gymnasium, etc.:			
United Kingdom	$86,624	$65,722	$71,660
Canada	22,745	24,955	78,897
Australia	77	706	5,971
Germany	170	.....	.....
Japan	29	5,621	5,499
United States	17,806	16,585	17,743
Total	127,451	113,589	179,770

Articles and countries.	1914	1917	1919
Cork and sock soles, molded rubber soles:			
United Kingdom	$5,328	$8,492	$17,407
Canada	798	1,840	.....
Australia	.....	63	3,966
Germany	.....	301	.....
Japan	.....	161	433
United States	29	842	1,854
All other countries	88	19	.....
Total	6,544	11,417	23,660

This class of goods is distributed through the wholesale dry goods importing houses and by wholesale and retail shoe importing houses.

Rubber Goods for Industrial Purposes

The imports of rubber goods for industrial purposes form an important item, and the demand is increasing from year to year, as indicated by the following tables giving the imports by countries of the different classes as arranged by the customs authorities for the years 1914, 1917, and 1919.

Articles and countries.	1914	1917	1919
Belting, including canvas and rubber:			
United Kingdom	$132,578	$189,637	$242,975
Canada	288	83	8,458
Australia	5,089	13,427	17,344
Germany	2,638	63	.....
Japan	.....	.....	7,737
United States	13,579	26,809	159,086
All other countries	160	117	.....
Total	154,332	230,136	435,600
Hose, tubing, and piping:			
United Kngdom	57,863	49,054	48,986
Canada	2,725	2,054	14,560
Australia	92,619	91,885	83,356
Germany	2,238	.....	.....
Japan	.....	1,406	2,663
United States	19,169	8,657	23,529
All other countries	34	83	.....
Total	174,648	153,139	173,096
Washer rings, gloves, etc.:			
United Kingdom	17,208	8,429	9,124
Canada	473	340	549
Australia	28,727	34,031	63,576
Germany	3,138	.....	.....
Washer rings, gloves, etc —Con.			
Japan	.....	$54	$15
United States	$6,813	9,874	19,558
All other countries	116	.....	19
Total	56,475	52,728	92,841
Insulated cable and wire:			
United Kingdom	571,813	281,371	340,455
Australia	7,275	8,233	15,991
Belgium	29,466	.....	.....
Germany	77,455	.....	.....
Japan	.....	48,919	194,095
United States	5,363	34,683	42,563
All other countries	4,449	1,104	1,855
Total	695,821	374,310	594,959
Rubber boots:			
United Kingdom	11,245	3,621	25,160
Canada	11,688	27,704	50,519
Australia	744	871	2,010
United States	48,941	50,563	57,663
All other countries	19	.....	.....
Total	72,637	82,759	135,352

This class of goods is usually distributed through the importers of machinery and hardware merchants.

Terms in general, prior to the war, were against documents at port of discharge or 30 and 60 days' sight drafts, but since the war a very much greater portion of the supplies is paid for against shipping documents at the loading port. This condition may continue for some little time, but it is expected when conditions return to normal, or nearly so, that the old custom will very largely prevail.

Other Rubber Goods

There is a fair demand in New Zealand for rubber clothing, hard rubber, insulated wire and cables, soles and heels, matting, friction tape, and certain lines of druggists' sundries, but as these lines are not classified separately there are no definite figures covering imports.

List of Importers

The following lists of importers and dealers interested in rubber goods can be obtained from the Bureau of Foreign aid Domestic Commerce or its district and cooperative offices by referring to the titles and file numbers:

	File No.
Importers of hardware in Australia	FE-23006
Importers and dealers in motor vehicles in Australia	FE-23007-A
General exporters and importers in Australia	FE-23009
Importers and dealers in boots and shoes in Australia	FE-23015
Importers and dealers in drugs and chemicals in Australia	FE-23023
Importers and dealers in boots and shoes in New Zealand	FE-24003
Importers and dealers in motor vehicles in New Zealand	FE-24004
Hardware importers and dealers in New Zealand	FE-24012
Importers and dealers in dry goods in New Zealand	FE-24014
Importers and dealers in drugs and chemicals in New Zealand	FE-24015

Suggestions for the Mill Room

By Malcom C. W. Tomlinson

The next decade must and will see many changes not only in milling machinery available but also in the methods of operation used in mill rooms. That the machinery can be improved is apparent to any mechanical engineer with steel mill experience. The new methods will come as a result of the period of keen competition which we are now entering.

In order that progress be made it is necessary that experiences be exchanged as any benefit which the industry receives will indirectly benefit everyone connected with rubber manufacturing. There has been too much of a tendency to keep secret all rubber data obtained through experience or tests and this inclination has undoubtedly aided in the promotion of a great number of small rubber plants.

The information presented in this article concerns gearing for mills and the thermostatic control of the hot water used in calendering.

Mill Gearing

Production demands have introduced a change in rubber mill construction from the cast iron cut tooth to the cast steel cast tooth or cut tooth spur gear. This change has brought with it a great amount of undesirable noise and has been accompanied with a tendency to speed up from the old 17 to 20 r.p.m. to from 25 to 30 r.p.m. on the back roll. The result has been that the cast steel teeth have worn down rapidly and that breakage occurs not only in the gearing but also in the housing of the mills. In one case a 48-inch mill separately driven by motor and running at approximately 28 r.p.m. on the back roll broke a cast iron cut tooth spur gear three weeks after it had been installed. The gear in question had cost $185.00. A new cast steel cast tooth gear which had cost $285.00 was immediately substituted but the clatter was deafening. As the Pittsburgh street railways had had considerable success with a cast steel heat treated gear with teeth cut on a small helical angle it was decided to try such a drive for the troublesome mill. The gear cost $400.00 and the pinion for the same cost $82.00. The installation was an immediate success as the noise disappeared. There can be no doubt that the life of this new gear will be from three to four times that of the cast steel gear due to the heat treatment which breaks down the granular structure of the steel, eliminates a large amount of slag content and other imperfections found in all cast steel and toughens the whole piece. In addition the helical tooth gives the same smoothness of operation found in the herringbone gear without the extremely high cost incident to machining. Such gears can be operated successfully and smoothly at the higher mill speeds for larger production when mill housings have been designed to stand the additional strain.

Thermostatic Control for Calenders

Calender manufacturers have sacrificed ruggedness in their rolls in order to obtain greater production by a reduction in the thickness of the shell. This has caused much confusion in the mill room due to the fact that the thicker shells of old calenders require a water temperature which will tend to burn the rubber on the new calender.

In order to meet such conditions the hot water supplied to the old calenders can be furnished as usual while the new calenders can be equipped with a thermostatic control. This will require a steel water tank equipped with a small steam coil. The steam is controlled before entering the tank by a tank regulator whose operation is governed by the prevailing tank temperature.

Two types of tank regulators are to be found on the market. One is the sylphon type which depends on the expansion of a volatile liquid and which is restricted to a temperature range between 140 degrees F. and 180 degrees F. The second depends on the expansion of a metal tube and, while it covers a much wider range, is not as sensitive and so may require attention frequently. Both types operate a diaphragm steam valve. A water pressure regulator may also be found necessary where pressures are variable.

The value of thermostatic control is known and appreciated in vulcanizer operation. As it not only conserves steam but also insures uniform and increased production its use for calender work ought to be worth investigation and trial.

Carbon Black-Its Nature and Uses

By A. F. Kitchel

Assistant Secretary, National Gas Products Association

Various articles have recently appeared in the daily press with reference to the situation which is now confronting the producers of carbon black in this country and we believe it will be to the interest of your readers to have this matter thoroughly explained in detail, so that a true conception may be had of the facts in the case.

Carbon black is the name commercially applied to an amorphous form of soft carbon, produced by the combustion of natural gas. It must not be confused with lamp black, which is a black manufactured by the burning of oil. As a matter of fact, carbon black and lamp black are distinct products, differing from each other in molecular structure, tinctorial strength and other properties, and for the most part, in their industrial uses as well. The distinct qualities of the natural gas product, carbon black, are its lightness and fineness, freedom from hard or gritty particles, miscibility in oil, intensity of color and remarkable coloring power when mixed with oils or other substances. No other black possesses this combination of properties. Carbon black is made only from natural gas. It cannot be commercially manufactured from any other substance. Theoretically, no doubt, it could be made from illuminating gas, but this would be impossible as a commercial operation on account of the low yield and prohibitive cost.

Carbon Black a Staple Commodity

The business of manufacturing carbon black from natural gas is not an experiment, but an established industry which has been conducted in the United States for forty years or more. its origin and growth have been coincident with the coming into general use of the modern printing press, requiring an abundant supply of ink adapted to rapid presswork. Carbon black, or gas black, is today a staple commodity as well known to the many arts and industries which depend upon it, as are aniline dyes or linseed oil. There are all together some forty carbon black factories in this country, located for the most part in regions remote from centers of population, and distributed among the states of Pennsylvania, West Virginia, Kentucky, Louisiana, Montana and Wyoming. These factories with the wells and pipe lines that supply them, and the gasoline plants operated therewith represent an investment of upward $25,000,000.

Carbon black ranks among the most useful of natural gas products. Indeed, its uses are such that it may without exaggeration be said to minister in some form to the convenience and comfort of every citizen. In point of time, its universal use was primarily connected with the manufacture of newspaper inks. Such inks are made by the admixture of carbon black and certain oils in the approximate proportion of one pound of black to eight pounds of oil. The resulting nine pounds of ink is sufficient to print approximately 2,250 copies of the average newspaper. In the year 1914, there were no less than 22,754 newspapers and periodicals published in the United States, employing 112,000 wage earners and having a combined circulation of 14,000,000,000 copies or 140 copies for each man, woman and child in our country. There were in the same year, 33,471 printing establishments, employing 272,000 wage earners and having a product valued at $643,000,000. More than 175,000,000 books and pamphlets were printed, of which at least 100,000,000 were educational or religious in character. These publications required annually over 100,000,000 pounds of printing ink.

An Essential Material

The modern rotary press, which has come into general use during recent years, is now capable of 200,000 pages per hour, or over 50 per second. Manifestly the ink essential for operations of such rapidity must flow freely, possess great covering power and make an instantaneous and legible impression. For such ink, carbon black is the ideal and indispensable material.

The National Association of Printing Ink Makers, which comprises most of the printing ink trade of the United States and is thus in a position to speak with authority, is responsible for the statement that without carbon black, "It would be impossible to continue the supply of ink requisite for the printing of newspapers." Mr. Ruxton, its president, himself a well known ink manufacturer, says that,

"In the manufacture of newspaper inks, carbon black made from natural gas is an essential ingredient. No satisfactory substitute is available. Any restriction or curtailment of the output of carbon black therefore, presents the gravest cause for apprehension, not only to the ink manufacturers, but to the publishers of newspapers and to the entire reading public."

Carbon black is also an universal ingredient in carbon papers, typewriter ribbons and duplicating equipment.

The Manufacture of Tires

Of great importance during the last seven or eight years, has been the development of the use of carbon black in the manufacture of automobile tires, both solid and pneumatic. In 1920 there were 8,000,000 automobiles in the United States. It is estimated that the American tire manufacturers had an output in that year, of about 35,000,000 tires. Taking these tires at an average price of $25, the tire bill of the American people was in the neighborhood of $800,000,000. The great majority of the better class of tires today, carry black treads, and in the manufacture of these tires millions of pounds of carbon black were employed. The black is used, not for the sake of its color, but because it has been found that it adds to the toughness and resiliency of the rubber, giving better traction and much longer mileage. Tests conducted by the leading technical experts of the rubber industry have demonstrated that carbon black added in certain proportions to their compounds, gives an increase of 26 per cent in tensile strength and 10 per cent in elasticity. It also decreases weight, cost and time of cure, and, by retarding oxidization, prolongs the tire's useful life. Manufacturers, who formerly guaranteed a mileage of from 3,000 to 4,000 miles, are now making adjustments of black tread tires on a basis of from 6,000 to 10,000 miles. If only 10 per cent additional mileage resulted from the use of black in these tires, it would mean a saving of $80,000,000 in the tire bill of the American people for that year.

These are by no means, all the ways in which carbon black serves mankind. Other commodities in which it is an ingredient are paint, varnish, stove polish, crayons, waterproof coverings, cement colorings, composition goods and paper. During the war, millions of pounds of carbon black were supplied for the manufacture of tires for artillery and ammunition trucks, airplane tires, gas masks and camouflage material.

Increasing the Gasoline Supply

Another feature of the carbon black industry is that it adds appreciably to the supply of high-gravity gasoline. Wherever practical, the factories are now equipped with absorption plants to extract every drop of available gasoline from the raw gas. Only the residue of gas remaining after such extraction is consumed in black production, thus several million gallons of gasoline are added yearly to the nation's supply as an incident to carbon black manufacture. In most instances, the recovery of this gasoline would be otherwise impossible on account of the limited local demand and consequent inability to market the gas after gasoline extraction for other purposes.

The gasoline so produced, according to the United States Geological Survey, "Represents a contribution to the gasoline supply of the counry of far greater importance than its statistical position would indicate. On the one hand it represents a production of a type of gasoline that will fulfill the rigid requirements of motor fuel for airplanes in high altitude duty and also a type of high-gravity material that will blend with low gravity naphthas to produce a desirable fuel for or-

dinary motors. On the other hand, the production of natural gas gasoline represents true conservation."

The entire process is the most efficient that forty years of experiments and experience have been able to devise. Chemists and engineers are constantly employed in research work connected with the various manufacturing problems. One criticism often advanced is that, while there are said to be about thirty pounds of carbon in one thousand cubic feet of gas, only about two pounds of black are manufactured. But this criticism confuses the element carbon, with the commercial product carbon black. The element is protean, existing in such diverse forms as the diamond, graphite, coal, oil, gas and the breath exhaled and in any kind of organic matter. The whole industrial value of the product, carbon black, lies in its unique form and properties. It is possible to increase the yield of mere carbon from gas. Many methods of doing so having been devised but every one of them have thus far proved a failure, because it obtained quantity only at the sacrifice of the qualities on which commercial value depends. Few human processes approach theoretical perfection, so that mere criticism of the carbon black manufacturer's process are not persuasive on this account.

Efficent Process Employed

The carbon black companies are naturally vitally interested in the conservation of natural gas, upon which the continuance of their business depends. The processes employed are the best and most efficient which have been developed through the several years. If anything materially better, more economical or more efficient, were known is it not reasonable to believe that the manufacturers would have adopted and put same into successful operation? There has recently been widely published under authority of the Bureau of Mines, a series of articles on the manufacture of this material. Nowhere is it suggested that any more efficient process has been developed or exists. If our process was obsolete or antiquated, or had been superseded by more efficient methods, is it probable that the Bureau of Mines would have suppressed or concealed the fact?

Wastage of Gas

On the one hand, the carbon black manufacturers stand ready and willing to be of assistance in furnishing gas to local communities or pipe lines at a reasonable price. On the other hand, it is estimated by competent authority, that the sheer waste of natural gas in some of the states mentioned exceeds 150,000,000 cubic feet per day, or more than is consumed by the entire gas black industry of the entire United States. This is real national wastage and the carbon black manufacturers are naturally opposed to same.

Resolutions Adopted

The National Association of Printing Ink Makers in recent resolutions opposing any undue legislation against the use of natural gas for the manufacture of carbon black, in its preamble states that:

"WHEREAS, we deem it unpatriotic for any one or group of states of our country to restrict their natural resources to the exclusion of the advancement of the rest of the Union, as, were such a spirit pursued, the State of Maine might prevent its wood resources from being used for the manufacture of paper, or coal producing states prevent their coal from being used in other localities."

Other trade organizations are now taking up the subject and will doubtless protest against the proposed prohibition or serious curtailment of this industry in the other states.

All that the carbon black manufacturers ask is the right to continue reasonable use of gas from their own wells to operate their factories and the right to buy gas in the open market in fair competition with other industrial users. They do not think it un-American to ask the right to compete on equal terms.

The Danger of Discrimination

They do, however, call the attention of other enterprises to the danger of discrimination between manufacturers, whereby it might be established that one industry should have the right to buy gas whereas another should not. Such laws despoil one manufacturer or class of manufacturers for the benefit of another. They suppress competition in the interests of those favored. If, for example, manufacturers of carbon black and gasoline may be deprived of the right to compete in the production or purchase of gas at the instance of another manufacturer, may not this manufacturer in his turn, be deprived of a like right at the instance of some different manufacturer and so on?

Is not the true principle that of equal opportunity and open competition, which has long been the American policy to foster and encourage? The old fable of the body and its members has not ceased to be true. In the laudable desire to save natural gas in certain localities, we must not forget the welfare or convenience of the body politic as a whole. A saving would be too dearly bought if accomplished only at the inconvenience and detriment of the entire public.

The Gutta-Percha Trade of the Netherlands

The appended table shows the imports of raw and manufactured gutta-percha into and the exports from the Netherland during all of 1919 and the first nine months of 1920 (1 kilo = 2.2 pounds, 1 florin = $0.402 at par):

Countries	Imports from.				Exports to.			
	Calendar year, 1919.		Jan. 1-Oct. 1, 1920.		Calendar year, 1919.		Jan. 1-Oct.1, 1920.	
	Kilos.	Florins.	Kilos.	Florins.	Kilos.	Florins.	Kilos.	Florins
GUTTA-PERCHA, RAW.								
Belgium	7,500	18,750	.....	.....	.....	.....	2,538	5,000
Germany	.....	.....	164	1,104	29,729	25,800	2,189	18,500
Great Britain	.....	.....	.....	.....	.....	.....	1,161	9,500
All other countries	630	1,812	78	325	.....	.....	160	1,418
Total	8,130	20,562	242	1,429	29,729	25,800	6,048	34,418
GUTTA-PERCHA, MANUFACTURES.							.....	.....
Bulgaria	.....	.....	.....	.....	.....	.....	943	8,744
Dutch East Indies	.....	.....	.....	.....	36	457	3,406	27,443
Germany	1,401	3,736	.....	.....	.....	.....	.....	.....
Great Britain	41,556	222,278	89,135	333,099	19	600	247	2,756
Russia, European	.....	.....	.....	.....	120	800	.....	.....
All other countries	8,869	55,325	14,643	74,191	88	754	349	2,719
Total	51,826	281,276	103,778	407,290	263	2,611	4,945	41,662

From the above table it appears that only a small quantity of raw gutta-percha is being imported into the Netherlands and that the country is a rather unimportant consumer of the manufactures of gutta-percha. Great Britain takes a prominent place among the exporting countries and supplies by far the largest percentage of the manufacturers.

Plantation Established

The Netherlands India Government has established an extensive plantation in one of the districts of Java, viz, at Tjipetir, in the Preanger, which is known as Gouvernements Getah Pertja Onderneming (Government Gutta-Percha Establishment). This plantation is being developed so as to enlarge the supply of gutta-percha available for export. The export of this product from the Indies to the Netherlands is in the hands of the Nederlandsche Handel Maatschappij (Netherlands Trading Association). Like many other colonial products, gutta-percha is handled by brokers.

(The name of the leading firm in this line may be obtained from the Bureau of Foreign and Domestic Commerce or its district and cooperative offices. Refer to file No. 44214.)

NEWS OF THE INDUSTRY

News -- Personals -- Financial -- Building Activities -- New Products

Goodyear Outlines New Plans

Akron Firm Issues Notices Calling Special Meeting of Stockholders--Official Statement Recently Issued by Company Explains in Detail the Need for Refinancing

Official notices were issued February 16 calling a special meeting of stockholders of the Goodyear Tire & Rubber Co. to consider refinancing plans agreed upon by directors of the company, New York bankers and creditors in recent conference in New York.

At this time officers and directors of the company who negotiated with New York bankers for a loan to cover the indebtedness of the company and provide a working capital, will explain the terms laid down by the underwriting syndicate and the creditors. A proposal to reorganize the company and to change the charter of incorporation to meet these terms will be placed before the stockholders for their approval.

It is expected that the period immediately preceding the meeting will be used by Goodyear officials in obtaining proxies of stockholders to put the plan into effect.

The plan to come before the stockholders provides for the authorization of an issue not to exceed $65,000,000 of bonds or debentures of the company to mature in 30 years and to bear 8 per cent interest; also to authorize the mortgage or pledge of the company's assets to secure the payment of such bonds; to authorize in connection with their sale, the issue of prior preference stock, management stock, preferred stock and common stock; to authorize the sale of the entire property and assets or any part thereof for money, stocks or bonds and other such matters as may be included in the refinancing plan.

To pave the way for such action the call for the meeting also provides for the reorganization of the Goodyear company under which the company will have an authorized capitalization as follows:

Authorized Capitalization

(a) Prior preference stock of such aggregate par value as may be determined at said meeting, to be divided into shares of the par value of $100 each, to be entitled to receive dividends at the rate af eight per cent. per annum, and no more, cumulative from January 1, 1921 before any dividends shall be paid or declared on the management stock or the preferred stock or the common stock, and before any of the preferred stock shall be redeemed; to be redeemable in whole or in part at the company's option on any dividend payment date at 110 per cent. of the par value and accrued dividends; to be entitled to receive upon any dissolution, liquidation or winding up of the company, if voluntary, 110 per cent. of the par value, or if involuntary, the par value, in either case with all accrued unpaid dividends, before any distribution of the assets to the preferred stock or to the common stock, but entitled to no further participation in such distribution; the holders thereof voting separately as a class, to be entitled, subject to the prior rights of the management stock, to elect a majority of the board of directors of the company; and to be entitled to such further or other rights, privileges and preferences, including the setting aside of a fund for the purchase or redemption thereof, as may be determined at said meeting.

Management Stock

(b) Management stock of such number of shares and of such par value as may be determined at said meeting to be entitled, so long as there shall be outstanding any of the bonds or debentures the issue of which may be authorized at said meeting, to dividends at a rate not exceeding an aggregate for the entire class of $30,000 per annum in priority to the preferred stock and the common stock, and to exclusive voting power for the election of a majority of the board of directors of the company or such greater number of the members of said board as may be determined at said meeting and to have such further or other rights as may be so determined.

(c) $100,000,000, par value, of preferred stock to be divided into shares of the par value of $100 each, and to have subject to the prior rights of the prior preference stock as may be determined at said meeting and to the prior rights of the management stock as may be so determined, and subject also to the right of the company to create the bonds and/or debentures hereinafter mentioned, substantially the same rights and preferences as the outstanding preferred stock or such other rights and preferences as may be determined at the meeting: and

(d) not exceeding 1,500,000 shares of common stock without par value.

Terms of Exchange

The terms upon which the outstanding shares of stock are to be exchanged for the new shares are as follows: one share of the outstanding preferred will be exchanged for one share of new preferred and one share of outstanding common will be exchanged for one share of new common without nominal or par value.

In a statement given out for publication prior to the call for the stockholders meeting, directors of the Goodyear explained the company's need for refinancing as follows:

"Briefly, the financing plan simply provides for converting pressing current indebtedness and a portion of the future contractual commitments into bonds, debentures and prior preference stock.

Removes Dangers

"When the assent of present stockholders and creditors is secured to this plan, it will relieve the company of its financial embarrassment, will remove the danger of legal action by creditors and will give the company adequate finances to proceed with production and the increase in its business.

"Letters are now being prepared to go out to stockholders explaining the plan in detail.

"At first glance it may appear that the plan is placing additional obligations ahead of the present stock interests, but such is not the case.

"The present indebtedness of the company must be paid before the present stockholders can participate.

"The company's indebtedness to banks and merchandise creditors stands as prior lien against the company's resources before the preferred and common stock.

"But in its present form, this current indebtedness demands the immediate payment and is a present liability.

"The plan provides, however, for extending the time of payment of this indebtedness so that it can be retired year by year over a period of time.

"The bonds are payable in twenty years. The debentures are payable in ten years.

"And the prior preference stock is to be paid off and retired at a certain rate each year and can be retired in any amount the company desires on any dividend period.

Extending Indebtedness

"In other words, the plan simply provides for extending our indebtedness over a long period of time and paying interest on it until paid, giving our creditors adequate security for the final payment.

"Most large companies have obligations to banks and merchandise creditors at all times and the position of The Goodyear Tire & Rubber Co. is not peculiar in this respect.

"The Goodyear Tire & Rubber company's position is peculiar, however, in the fact that it has done a very large business on a relatively small capital.

"But by funding this indebtedness and converting it into the capital account, the plan proposed will give Goodyear ample time to reduce its obligations and will

provide adequate finances for its operations.

"But even with the issuance of these new securities, Goodyear relatively, will not have any larger financial obligations than other concerns with corresponding sales.

"If you have studied the history of The Goodyear Tire & Rubber company carefully, you will have come to the conclusion that the big problem of the company in the past has been its financial position.

"The company's business has grown so rapidly that no one was able to foresee the extent of its financial needs.

"Consequently, at almost regular intervals the company was forced to seek additional finances, and usually at a time when they were hard to get.

Adequate Funds

"If this plan is approved we will have adequate finances to carry on our business in the future.

"Our credit will be restored.

"The sales force will be able to get into its real stride selling goods with the assurance that we have adequate resources for production.

"The financial interest participating in the plan have the highest regard for the manufacturing and selling policies of the company, and are anxious to see these policies carried forward to higher success than any heretofore attained.

"With the announcement of this plan, some stockholders doubtless failed to understand it, and as a result, both preferred and common stocks dropped to new low levels.

"Some of them may have felt that the plan places additional obligations ahead of their stock.

"But the fact is that the indebtedness was already a prior claim ahead of all capital stock.

To Pay Indebtedness

"The greater part of the new securities being issued are being put out to pay two kinds of present indebtedness: First, bank indebtedness, which has always been payable in from three to four months; second, merchandise indebtedness, usually payable in from ten to 30 days.

"So that instead of facing the short time obligations, we now propose to defer payment of bank and merchandise indebtedness from ten to 20 years.

"As a matter of fact, the deferring of these obligations places the company in a stronger financial position than it has ever occupied.

"Furthermore, the plan contemplates "writing down" our inventories and commitments and converting part of the difference between cost and market value of raw materials into prior preference stock, so that our earning ability will be immediately inhanced and the time when dividends may be paid on both preferred and common stock will be brought nearer.

"This company has made money every year for many years.

Wiped Out Profits

"But in 1920 the sharp decline in raw material and the general curtailment of business wiped out all accumulated profits and left the company with a substantial deficit.

"This plan has been formulated to correct this situation, to wipe out the deficit, to enable the company to operate on costs based on present market values and to resume earnings.

"So while the present low market prices of our stocks do not look good to those of us who hold them, we can all feel that the value of these stocks is made more secure and the future prospects are made brighter by the plan which proposes to relieve us of the dangers of pressure by our creditors.

"It should be understood that while it is proposed to authorize $35,000,000 of prior preference stock, only such portion of this as is needed will be issued.

"It should also be understood that the company's losses are by no means as great as the present indebtedness.

"A large portion of the indebtedness represents materials and inventory on hand which have cash value and will be converted into cash as fast as sales are made.

"Also part of the losses are simply computing by inventorying materials at market prices which are lower than the prices paid.

"The prices of finished product, however, are based on cost prices rather than market prices so that some of these losses may not be realized.

"Assuming that the plan will be approved, we will soon be able to increase production substantially to take care of the increased business we feel sure the sales force will turn in from now on.

"In fact, we have already made production increases in some lines where stocks were running low."

Dubosc Comments upon Peachey Process

During the last few months rubber chemists the country over have exhibited considerable interest in the process for the cold vulcanization of rubber by gases ascribed to S. J. Peachey, of Manchester, England. Comes now a letter to the editor of THE RUBBER AGE from Monsieur A. Dubosc, the distinguished French rubber chemist and editor of "La Caoutchouc et la Gutta-Percha" in which the writer states that he "demonstrated several years before Mr. Peachey the possibility of vulcanizing rubber by means of colloidal sulphur". The letter is as follows:

January 9, 1921

EDITOR OF THE RUBBER AGE:—

"In your issue for November 25, 1920 there appears an article entitled "The New Process of Vulcanizing Rubber" which describes a method suggested by Mr. Peachey to utilize simultaneously sulphur dioxide and hydrogen sulphide to determine the formation of colloidal sulphur which combines with and vulcanizes the rubber.

"This process is by no means a novelty as is implied by Mr. Peachey who simply used without giving me credit a reaction which I described extensively in 'La Caoutchouc et la Guttapercha' for March 15, 1915, under the title 'Hypothesis sur la Vulcanization' and which was translated into English by Dr. Torrey and Mr. Stassin in the India Rubber Journal of May 1, 1915.

The Article in Question

"Here is the translation of that article:

'When resins are heated with sulphur, hydrogen sulphide is produced. In fact this reaction, well known to those who have studied petroleums, is made use of in degradation of complex hydrocarbons; when the 'insoluble portions' of crude rubber (consisting of proteids and oxidized rubbers) hydrogen sulphide and sulphur dioxide are produced.

'If sulphur be heated with a metallic oxide (such as oxide of zinc, lead, magnesia, or antimony) either in presence of air or in presence of some substance containing mechanically entrained air such as 'light calcined magnesia' there is produced sulphur dioxide and a metallic sulphide corresponding to the metal whose oxide was used.

'Now, the role of the resin, the insoluble portions of rubber or the oxide is simply to give rise to the production of sulphur dioxide, hydrogen sulphide, and metallic sulphide. By this means the octatomic sulphur is transformed into monatomic form which enters into the compounds H_2S and SO_2. The researches of Graham and others on osmose of various gases through rubber have shown that both the gases mentioned above are in considerable quantities by rubber, which means that they diffuse readily.

'What now is the reaction between the sulphur dioxide and hydrogen sulphide? It is very simple and well known to gas works chemists, for it is one of the methods of purifying illuminating gas.

The reaction is $2(H_2S) + SO_2 = 2H_2O + 3S$.

The product being water and monatomic or colloidal sulphur. All of this sulphur which was present as SO_2 or H_2S diffused through the mass of rubber has been transformed into colloidal sulphur capable of uniting with the rubber and saturating the double bonds of the caoutchouc molecule.'

"After this citation one seems justified in asking what remains of Peachey's discovery?

"I hope therefore, that you will publish my protest about the manner in which Mr. Peachey has taken advantage of my ideas, attempting to cover them with a patent which is valueless since I made it public in March, 1915."

A. DUBOSC

Changes in Freight Classification

The following bulletin has been recently sent by the Rubber Association of America to its members:

The Consolidated Freight Classification Committee has published Consolidated Freight Classification No. 2 effective April 1st, 1921. Copies of this publication that contains ratings, descriptions of packages, specifications for containers and other rules governing acceptance of freight for transportation can be secured by requesting copy from R. C. Fyfe, chairman, Consolidated Freight Classification Committee, Transportation Building, Chicago, Ill., at annual subscription rate of $2.00 per copy.

This publication contains a number of changes in ratings of interest to the members; the nature of these changes follows:

Hose—Cotton, Linen, Leather or Rubber, Separate or Combined, with or without Wire Reinforcement: The less than carload ratings on this commodity for application to and within Western classification territory, when shipped in wrapped bales, bundles, or rolls or in crates, is reduced from first class to second class.

Leather—Artificial or Imitation Including Coated Auto Top Material: The ratings applicable in Western classification territory are reduced on less than carload shipments when in bales, boxes or wrapped bundles from first to second class and when in carloads in the packages named, ratings are reduced from third class to fourth class.

Packing: Ratings on less than carload shipments of asbestos packing compound or reinforced, in bales or burlapped rolls or in barrels or boxes, is reduced in Western classification territory from first class to second class.

Packing manufactured from rubber or gummed compound in bales or burlapped rolls or in barrels, boxes or crates, less than carloads is reduced in Western classification territory from first to second class and in carloads from third class to fourth class.

Tires, Rubber Pneumatics: The most important change in the classification as effecting rubber manufactured products, is the granting of the application of the traffic committee of the association for reduction in the carload ratings of pneumatic tires in carloads to and between points in Western classification territory from second class to third class, with minimum carload weight of 20,000 pounds.

The establishment of these reduced ratings on pneumatic tires places the ratings on the same basis throughout the United States.

Heretofore the classification provided that in order to secure first class rates on pneumatic tires in crates, in less than carloads, to and within Western classification territory, it was necessary to line the crates with strawboard or pulpboard. This requirement has now been removed and on and after April 1st, 1921 the first class rates will apply on tires shipped in unlined crates to and within points in Western classification territory, the same as applies in Eastern and Southern territory.

Solid Tires: Less than carload ratings on solid tires, in burlapped bales or burlapped bundles or burlapped reels, or on bundles enclosed in burlap-wrapped fibreboard or pulpboard containers or in boxes or crates, is increased from second class to first class in official classification territory, which is the territory applying east of the Mississippi and north of the Ohio and Potomac rivers.

Standardization of Insulated Wires and Cables

A conference on the standardization of insulated wires and cables was held in New York, February 2nd. The conference, which was called by the American Engineering Standards Committee at the instance of the American Railway Engineering Association, was attended by representatives of fourteen national organizations.

After a thorough discussion of the many considerations involved, it was unanimously decided that "The unification of specifications for wires and cables for other than telephone and telegraph use should be undertaken under one general plan, covering substantially all the more important uses." It was agreed that work on the following should be included: conductor, quality, stranding, sizes; rubber insulation, varnished cloth insulation, impregnated paper insulation, magnet wire (including enamel, cotton and silk insulation), fibrous coverings (including asbestos), sheaths, armor, standard make ups.

Nearly a dozen organizations now have important publications on the subject, and it was agreed that the proposed work should be a unification of the specifications and standards already in existence, rather than an attempt to formulate entirely new standards, except in fields not already covered.

It was the consensus of opinion that, in order to promote export trade, it would be desirable to have all the American wire and cable standards assembled in a single book. This form of publication, while giving due credit to the participating organizations would appear to foreign wire and cable purchasers as a complete book of American standards, rather than as the standards of societies comparatively unknown abroad. This has been done in a very thorough way by the Germans and to a considerable extent by the British, thus placing Americans at a decided disadvantage in foreign trade. It was agreed that if such a book were prepared and given proper publicity in foreign countries, it would remove one of the greatest difficulties under which American manufacturers are now laboring in developing export trade.

Finance Holding Movement

The American Express Company is reported to have promised the necessary funds to enable Egyptian cotton growers to withhold 2,000,000 cantars of cotton by the Egyptian Cotton Growers' Syndicate. Further details on this unusual situation are awaited by the trade.

Rubber Importations for January

Figures recently issued by the Rubber Association of America show an approximate reduction of thirty-three and a third per cent in the importations of crude rubber for the month of January 1921 as compared to those for January 1920. According to the figures total importations for January 1921 amounted to 14,177 tons while those for January 1920 totalled 21,351 tons. Following are the detailed statistics:

PLANTATIONS

From	Tons
Rotterdam	42
London	193
Singapore	9,151
Colombo	584
Belawan-Deli	1,874
Batavia	174
Cochin	108
Sourabaya	279
Penang	367
Port Dickson	10
Japan and others	37
	12,819

AFRICANS

From	Tons
West Africa	43
	43

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	3
Guayule (Mexico)	....
	3

PARAS

Manaos	868
Para	331
Iquitos	113
	1,312

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

	Tons
Waste	1,071
Balata	41
Miscellaneous Gums	173

Comparison 1920-1921

	Jan.-1920	Jan.-1921
Plantations	17,799	12,819
Paras	2,620	1,312
Africans	821	43
Centrals	111	3
Guayule	...	...
Manicoba and Matto Grosso	...	...
	21,351	14,177

ARRIVALS PLANTATIONS FOR JANUARY, 1921, SHOWING PORTS OF ORIGIN AND ARRIVAL

From	Arrived at	Tons
Singapore	New York	9,151
Penang	New York	367
Batavia	New York	174
Sourabaya	New York	279
Japan and others	Seattle	37
Cochin	New York	108
Port Dickson	New York	10
Colombo	New York	584
Belawan-Deli	New York	1,874
London	New York	193
Rotterdam	New York	42
		12,819

ARRIVALS OF PLANTATIONS BY PORTS

Atlantic Ports	
New York	12,782
Pacific Ports	
Seattle	37
	12,819

Niagara Sprayer Builds

The Niagara Sprayer Company, Middleport, N. Y., has completed a new sulphur refinery which is said to be one of the most modern refineries devoted exclusively to the manufacture of various grades of sulphur in the United States. This company has manufactured since 1917 Niagara Brand Impalpable Sulphur which is used in the rubber industry. In addition it also makes sulphur products for the insecticide market.

Personals of the Trade

Fisk Makes Promotions—Braham Joins Delion—Christensen with Cleveland Rubber Mold—Winchell a Consulting Engineer—Pasho with Coast Tire—Pennsylvania Elects Officers

Fisk Makes Promotions

The Fisk Rubber Company has recently announced the appointment of F. H. Ayers as director of sales. Mr. Ayers has

WILLIAM WIELD

been sales manager for the last four years, and has completed seventeen years of service with the company.

William Wield, who has been assistant-sales manager for three years, has been appointed sales manager.

C. H. Gage and L. N. Southmayd have been appointed assistant sales managers, and K. S. Chamberlain, manager of export sales.

Braham Joins Delion

John J. Braham, Jr., of Brooklyn, N. Y., who until recently was connected with the sales department of the Keystone Tire & Rubber Company, of New York City, has joined the selling force of The Delion Tire & Rubber Company. Mr. Braham was elected a vice-president at the annual meeting of the board of directors. He will continue to reside in Brooklyn and will make his headquarters in New York, at the company's branch, 203 West 72nd Street.

Christensen with Cleveland Rubber Mold

The Cleveland Rubber Mold Foundry & Machine Co., Cleveland, announces that in the future A. E. Christensen will have charge of production of the mold and core and rubber machinery departments. Mr. Christensen was formerly production superintendent of the Bridgewater Machine Company, of Akron, Ohio; production superintendent of the core and mold division of the B. F. Goodrich Co. and superintendent of the Vulean Welding & Machine Company of Akron.

Winchell a Consulting Engineer

George C. Winchel, mechanical engineer for the Woodard Machine Co., Wooster, Ohio, and for several years associated with the Goodyear Tire & Rubber Co. and the B. F. Goodrich Co. as designer, plant and research engineer is opening offices as a rubber and consulting engineer at 304 Everett building, Akron, Ohio.

Pasho with Coast Tire

J. D. Pasho, who, for the past four years, has been connected with the Portage Rubber Co., of Barberton, Ohio, has resigned his position as general sales manager to become general sales manager of The Coast Tire & Rubber Co., of Oakland, Cal. Mr. Pasho started in the tire business over ten years ago, and has had a wide experience as salesman, dealer, branch manager, and sales manager.

The Coast Tire & Rubber Co. is a California corporation, and has one of the most modern factories in the country with a capacity in the first unit of 1500 tires and 2000 tubes per day.

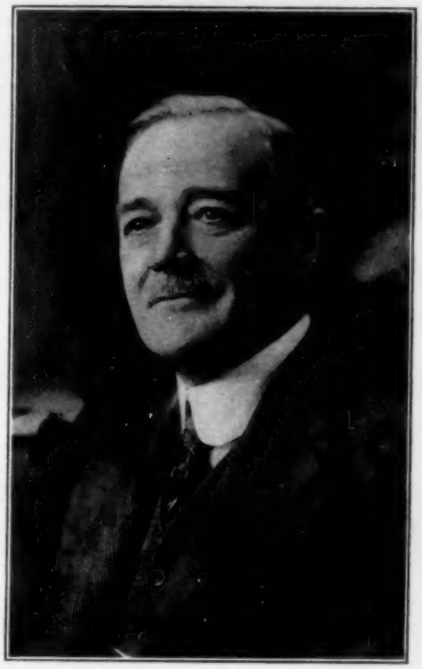
J. D. PASHO

Mr. Pasho assumed his new position January 1, and has his sales force traveling all of the western states. His many friends in the east wish him unlimited success in his new position.

Pennsylvania Elects Officers

At the annual meeting of the stockholders of the Pennsylvania Rubber Company, held February 7, 1921, the following directors were elected for the ensuing year:—Herbert Du Puy, Charles M. Du Puy, Seneca G. Lewis, George W. Daum, A. H. Price.

The directors subsequently re-elected the following officers:—Herbert Du Puy, chairman of the board; Charles M. Du



F. H. AYERS

Puy, president; Seneca G. Lewis, vice president and general manager; George W. Daum, assistant general manager; A. H. Price, treasurer; James Q. Goudie, general sales director; George W. Shiveley, secretary; C. G. Morill, assistant treasurer; H. H. Salmon, purchasing agent .

Woods Kansas City Manager

At the annual meeting of the Horse-Shoe Rubber Co., St. Louis and Kansas City, Mo. Earl L. Woods was elected a director and vice-president, in charge of the Kansas City territory. Mr. Woods, through his former position as sales manager of the J. I. Case Plow Co., Racine, Wis., has enjoyed a wide experience in the implement, vehicle and tractor business and is well known to the dealers of Missouri and Kansas.

The other directors and officers of the Hores-Shoe Rubber Co. are L. N. Burns, president; Paul Bakewell, Jr., secretary; C. Bernet and W. F. Dunlap.

William O'Neil Passes Away

(Special Akron Correspondence)

William J. O'Neil, aged 60 years, president of the O'Neil Tire & Rubber Co., died suddenly February 11 when stricken with apoplexy while riding to his office in the automobile of a friend.

Committees of the M. & A. M. A.

Announcement has been made that the following committees have been appointed from the board of directors of the Motor and Accessory Manufacturers Association for the coming year.

Executive Committee: E. H. Broadwell, chairman, Fisk Rubber Company, Chicopee Falls, Mass.; C. E. Thompson, Steel Products Co., Cleveland, Ohio; E. P. Hammond, Gemmer Manufacturing Co., Detroit, Mich.; W. O. Rutherford, B. F. Goodrich Co., Akron, Ohio; G. Brewer Griffin, Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.; A. W. Copland, Detroit, Gear & Machine Co., Detroit, Mich.; J. M. McComb, Crucible Steel Company of America, Pittsburgh, Pa.

Finance Committee: E. H. Broadwell, chairman, Fisk Rubber Company, Chicopee Falls, Mass.; C. E. Thompson, Steel Products Company, Cleveland, Ohio; E. P. Hammond, Gemmer Manufacturing Company, Detroit, Mich.; W. O. Rutherford, B. F. Goodrich Company, Akron, Ohio; G. Brewer Griffin, Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.; A. W. Copland, Detroit Gear & Machine Company, Detroit, Mich.; J. M. McComb, Crucible Steel Company of America, Pittsburgh, Pa.

Show & Allotment Committee: W. O. Rutherford, chairman, B. F. Goodrich Company, Akron, Ohio; G. Brewer Griffin, Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.; C. H. L. Flintermann, Detroit Pressed Steel Company, Detroit, Mich.

Banquet Committee: J. M. McComb, chairman, Crucible Steel Company of America, Pittsburgh, Pa.; E. P. Hammond, Gemmer Manufacturing Company, Detroit, Mich.; H. L. Horning, Waukesha Motor Company, Waukesha, Wis.; C. H. L. Flintermann, Detroit Pressed Steel Company, Detroit, Mich.; W. O. Rutherford, B. F. Goodrich Company, Akron, Ohio.

Membership Committee: A. W. Copland, chairman, Detroit Gear & Machine Company, Detroit, Mich.; G. W. Yeoman, Continental Motors Corporation, Detroit, Mich.; Fred Glover, Timken-Dertoit Axle Company, Detroit, Mich.

Mason Promotes Dennison

C. W. Mason, who was originally a Mason dealer in Pittsburgh, doing business under the name of The Pitt Tire Service Company, and who later became associated with the factory as manager of the Cincinnati store and about a year ago transferred to the management of the Cleveland branch, of the Mason Tire & Rubber Co., has just been appointed Pacific Coast manager, with headquarters at San Francisco, handling the San Francisco branch, which together with the Portland and Los Angeles branches, cover the entire Pacific Coast territory, including Arizona, California, Washington, Oregon and Nevada.

Jemison with Oldfield Tire

Barney Oldfield, president of the Oldfield Tire Co., of Akron, Ohio, announces the appointment of R. S. Jemison, as advertising and sales promotion manager. Mr. Jemison was for eleven years, sporting editor of the Atlanta, (Ga.,) Constitution. For the past year, he was in charge of sales promotion for the Miller Rubber Co.

Oldfield tires, built to meet the exacting requirements, of twenty-two years of tests by the World's Master Driver, will be merchandised on a bigger and broader scale than ever this year. An extensive advertising campaign, embracing national publications, trade papers, farm papers, newspapers and direct mail campaigns, will be launched in the near future.

Mohawk Elects Officers

(Special Akron Correspondence)

Reports read at the annual meeting of the Mohawk Rubber Co. February 14 showed the company in a trong financial position and with prospects for the coming year very bright. All preferred stock was retired during the year and common stockholders received a 10 per cent stock dividend and a 10 per cent cash dividend on their holdings.

The board of directors consisting of S. S. Miller, R. M. Pillmore, Francis Seiberling, J. K. Williams, C. W. McLaughlin, George A. Parker, H. L. Rose and M. E. Mason was re-elected. These directors named the following officers: R. M. Pillmore, president; S. S. Miller, vice-president and factory manager; M. E. Mason, vice-president and sales manager; C. W. McLaughlin, vice-president and treasurer; P. H. Goodall, secretary; R. E. Block, assistant treasurer; and W. J. Cope, assistant-treasurer.

Miller Reduces Salaries

Pay reductions, said to range from 10 to 25 per cent, for all salaried employes, have been announced by the Miller Rubber Co., Akron, Ohio, in notices sent to employes. The reduction becomes effective February 15.

Action of the Miller company makes the third large Akron rubber firm to reduce wages.

Hudson in New York City

Announcement has been made by the Hudson Tire Corporation, of Yonkers, N. Y., that on March 1 the firm will open a New York City branch in the Gotham National Bank building, Columbus Circle. Vice-president and Treasurer H. B. Seymour will be in charge.

Syra-Cords in Pittsburgh

Lynskey-Neal-Lynskey, well known tire dealers of Pittsburgh, Pa., recently obtained the selling rights for Pittsburgh and vicinity for Syra-Cord tires. William H. Neal, manager of the local company, predicts a big tire year.

Independent Makes Burrs

The Independent Nail & Packing Co., Bridgewater, Mass., has announced that in addition to manufacturing rubber heel nails and placing them in envelopes for the rubber heel trade, that they have recently begun the manufacture of rubber heel burrs.

Dunlop Passes Dividend

The affairs of the Dunlop Rubber Co., Ltd. have now been rearranged according to a statement issued from London. The shareholders have authorized the directors to create a £6,500,000 bond capital, whereof £5,000,000 will be issued. Of the latter £3,000,000 is to be publicly offered on terms as yet unannounced Feb. 14.

The board of directors has been reorganized, the new members being Sir Guy Granet and A. W. Tait, of George Touche & Co. F. A. Smearvasy, who arranged this reorganization, remains a director, as do also Sir Henry Dalziel and Sir Henry McGowan.

Regarding the American Dunlop Company, it is understood that a £12,000,000 bond issue is in contemplation, which will cover the $6,000,000 bonds maturing.

Palmer Opens Offices

The Palmer Tire Corporation, which manufactured and distributed the "Palmer Rebiltright" tire during 1920, have opened a suite of offices at No. 5 Columbus Circle, New York City.

The Palmer corporation has discontinued rebuilding tires and are making arrangements to erect an addition to their factory at Poughkeepsie, N. Y., and are equipping the plant for the manufacture of new 30 x 3½ tires and tubes exclusively.

The new product is to be known as the Henry tire and tube, Ford size only, and is to retail at a moderate price.

C. J. Davis, well known in Akron tire manufacturing circles, has been engaged to take entire charge of manufacturing at Poughkeepsie. F. D. Palmer, who organized the company, will have charge of the Poughkeepsie office, while E. K. Dusenbury will handle the selling end. H. J. Fitzpatrick of New York is treasurer of the company.

Martin Succeeds Kelley

James Martin, president of the Martin Tire Corporation, New York City, has acquired an interest in the Kelley Tire & Rubber Company of New Haven, Conn. The name of the latter concern has been changed to the Martin Tire & Rubber Co., with New York wholesale offices at 1656 Broadway.

Franklin Rubber Elects

The annual meeting of the Franklin Rubber Company, Boston, Mass., was held February 2nd, and at that time the following officers of the company were again re-elected: Asa C. Merrill president, Everett L. Fuller treasurer, and Lorin L. Fuller assistant treasurer. Following out the custom of the past few years, it was again voted that the employes be given a bonus based on their earnings of 1920, payable April 1st.

Wins Nobel Prize

The Nobel prize in chemistry for 1920 has been awarded to Prof. Ossian Aschan of the University of Helsingford for his research work in connection with the manufacture of artificial rubber.

MARKETS

Manufactured Rubber Goods

NEW YORK, FEBRUARY 20, 1921

Operations are still greatly curtailed in many branches of the rubber manufacturing trade and April is still spoken of as the month in which a general resumption is expected. Many of the companies are engaged in getting their finances in shape for the new start in business.

Rubber manufacturers at Akron are looking for an early improvement in export business. One company maintaining branches in many parts of Europe, the Orient and Australia reports that during the past thirty days cable orders have increased more than 1,000 tires over the previous month, while orders for other manufactured rubber goods show a similar increase. The same company has recently received an order for 100,000 tires for shipment to Mexico. More business is reported as coming from Japan. Despite the Cuban moratorium, business in rubber goods is holding up about fifty per cent of normal, one company alone shipping 35,000 tires per month to the island.

AUTOMOBILE TIRES

Manufacturers are still making plans for resuming production, and predict that business will show a vast improvement during the next few months. Many of the companies are engaged in reorganizing their businesses in order to place themselves upon a sound financial basis.

Estimates as to the quantity of tires which will be required during 1921 range from 25,000,000 to 38,000,000 tires. Deducting 10,000,000 tires, estimated quantity of surplus stocks from the extreme figure, the industry would be faced with the necessity of turning out fully 25,000,000 tires during the year. The prospective output of motor vehicles during the year is as yet uncertain, but any marked revival in demand for automobiles would inevitably increase the call for tires. The production of tires has been on a very low basis thus far in the year, and is expected to continue so for the remainder of the first quarter of the year at least. When the tire factories finally do get down to business, they will have to turn out 120,000 tires per day to bring the year's production up to the 25,000,000 mark.

DRUG SUNDRIES

Routine activity characterizes this branch of the market. Business has slackened to some extent during the past several months, and the trade is operating in a hand to mouth manner. The druggists' sundry manufacturers have been about the last in the rubber industry to feel the falling off of business, coincidental with the rigors of the readjustment period. The curtailment in this line however, has not been so drastic, owing to the essential nature of many of the products. Export buying of drug sundries is holding up fairly well on all lines.

RUBBER FOOTWEAR

The year 1921 has not started off any too well for manufacturers of rubbers, arctics and boots. Recent reductions in prices have contributed to a slightly improved market, but weather conditions have not been favorable to the sale of the products, and demand is lacking.

Spring business is beginning to improve somewhat on several lines, and the jobbers are beginning to stock up on summer sport footwear. Lower prices are expected to influence the sale of the goods this season and a fairly active demand is anticipated.

A fair call for rubber heels is reported, but much of the business is going to the brands which manufacturers have featured in national and local advertising. Continuence of the open weather conditions in the Eastern part of the country is keeping the trade fairly busy.

MECHANICAL GOODS

The demand for mechanicals is slow in getting under way, and while manufacturers are optimistic, they do not look for any magic resumption of buying. Production has been sharply cut down, and manufacturers are holding down their output to prevent an accumulation of surplus stocks.

Slackness in industrial centers is keeping down the demand for belting, and the same is true of the mining districts. Hose sales are not as heavy as normally at this season of the year. The call for marine specialities is also slow.

Cottons, Yarns and Fabrics

NEW YORK, FEBRUARY 20, 1921

Fractional declines in raw cotton have been made since the last report, the market being off all along the line. The market has been in a very nervous state during the period and is susceptible to the slightest pressure, either way.

Some strength in the market was reported early in the month, and the continued rise in foreign exchange rates gave rise to the belief that a better export demand was in sight. The exchange rates, however, have reacted somewhat during the past few days, throwing the market off. Exports to date are nearly 1,000,000 bales short of the total for the same time a year ago.

Buying strictly for manufacturing purposes has not displayed any great activity at any time during the past two weeks. While manufacturers are resuming operations in a fair way, production is still far behind normal for this season of the year, and the manufacturers are both unwilling and unable to load up with cotton in advance of their requirements.

With nothing new of importance to change the daily tenor of the market, the trade is looking for a fluctuating market, according to technical activities, until there is an appreciable change in the foreign outlook, or until something definite comes out of the South. In regard to the latter the two outstanding possibilities center around the possible further credit restrictions which would result in promiscuous dumping of cotton on the market, and, on the other hand, the first indication that the acreage reduction movement has actually taken hold. This latter would have the effect of materially strengthening the market.

February cotton in New York holds around 13.40 cents, with March at 13.62 cents, April 13.85 cents and May at 14.12 cents per pound. January delivery is quoted at 15.15 cents per pound.

EGYPTIAN COTTON

The Cotton Research Committee of the British Government has expressed considerable alarm over the present situation in the Egyptian cotton growing industry. Should the diminution in the yield of cotton continue, the report says, the result will be a veritable disaster for Egypt. Cotton has been grown in Egypt for about 100 years, and the value of the crop has steadily increased. American spinners are still practically out of the market for Egyptian cotton on large blocks. Many spinners still have on hand Egyptian cotton bought around the dollar per pound figure, and are holding this staple for use in manufacturing fabrics bought at high prices on future orders. Spinners naturally are unwilling to bring in large stocks of cheaper cotton until the high-cost supplies have been liquidated.

ARIZONA COTTON

Sales of Arizona long staple cotton continue scant, and the market is still enveloped in the general weakness. Best

grades of long staple are obtainable around the 33 cent mark, with the second grade held at about one cent under this figure. New England mills are not in the market for the domestic long staple in large quantities, and are buying only for immediate needs, which are very scant at the present time.

DRILLS, SHEETINGS AND OSNABURGS

General conditions in the market for cotton fabrics continue practically unchanged. The long-heralded improvement is slow in coming, but dealers believe that the close of the first quarter of the year will see business on a better basis. Orders are coming in a little bit more freely. The marked curtailment in operations at mill centers has had the effect of cutting down spot stocks, and buyers who have come into the market for sheetings and drills for prompt shipment have been surprised to find on numerous occasions that they would have to take early mill shipment goods to get the stocks and quantities desired. A routine call for osnaburgs continues. Prices are held nominally unchanged on most lines.

TIRE FABRICS

Open market quotations are still withheld by representatives of tire fabric spinners, who report that there is "nothing doing" in the market. Spinners are not anticipating any improvement in the situation until the tire plants resume operations on a large scale. It is thought in the trade that the supplies of fabrics still held by the tire manufacturers will soon be used up after production is resumed, and that the producers will be in the market for additional stocks of tire fabrics. Until such time, however, the spinners plan to keep their plants closed down.

HOSE AND BELTING FABRICS

Manufacturers of mechanicals have been showing comparatively little interest in offerings of ducks for some time past, and the market is still tending downward, a weak undertone being in evidence throughout. Some bargains are to be had in surplus stocks of ducks which the Government is offering.

TIRE FABRICS

17¼-ounce Sea Island, combed, sq. yd:		Nominal	
17¼-ounce Egyptian, combed		— @	—
17¼-ounce Egyptian, carded		— @	—
17¼-ounce Peelers, carded		— @	—
17¼-ounce Peelers, combed		— @	—

(Note:—In the absence of important trading, all tire fabric prices are temporarily withdrawn by manufacturers.)

DUCKS

Belting (pound basis)	lb.	.35 @	—
Hose (pound basis)	lb.	.35 @	—
*Enameling	lb.	.35 @	.40
Shoe Ducks	lb.	.40 @	.42
Single filling	yd.	.14 @	.18
Double filling	yd.	.17 @	.20

*Price varies according to width.

DRILLS

37-inch 3.25-yard	yd.	.10½ @	.10¾
37-inch 2.75-yard	yd.	.11½ @	.12
37-inch 3.00-yard	yd.	.11 @	—
37-inch 3.50-yard	yd.	.10 @	—
37-inch 3.95-yard	yd.	.09¼ @	.09½

OSNABURGS

30-inch 7-ounce		.08¾ @	—
40-inch 7-ounce		.10 @	—

SHEETINGS

40-inch 2.35-yard	yd.	Nominal	
40-inch 2.50-yard	yd.	.12½ @	.12¾
40-inch 2.85-yard	yd.	— @	—
40-inch 3.15-yard	yd.	.12½ @	.13
40-inch 3.60-yard	yd.	.09¾ @	.10
40-inch 3.75-yard	yd.	.09 @	.09¼
40-inch 4.25-yard	yd.	.08 @	—

Note—In view of the unsettled conditions prevailing in the market at the present time, the prices quoted above are more or less nominal, and are not guaranteed.

BURLAPS
(Carload Lots)

7 -ounce 40-inch		—— @	——
7½-ounce 40-inch		—— @	——
7½-ounce 45-inch		Nominal	
8 -ounce 40-inch		4.60 @	5.00
8½-ounce 40-inch		—— @	——
10 -ounce 36-inch		—— @	——
10 -ounce 40-inch		Nominal	
10 -ounce 45-inch		Nominal	
10½-ounce 40-inch		5.50 @	——

Chemicals and Compounding Materials

NEW YORK, FEBRUARY 20, 1921

Rubber manufacturers are still out of the market, insofar as any purchasing in large quantities is concerned, and materials used largely in this industry are showing a steady decline. It has been several months since the tire people have been active in the market, and with buying support lacking, sharp price reductions have been inevitable. Other lines, used by paint materials and manufacturers of other products, have not declined so heavily, but the movement generally has been down on all lines for the past six months or more.

Prices on many lines are still far from an even basis, and no real stability is to be looked for until buying is generally resumed. On a number of lines, price advances are expected as soon as the demand shows any signs of holding consistently up. On many others, producing costs have declined so materially, that producers will be able to sell at the new low prices.

IMPORTS AND EXPORTS

Export buying has been very slow during the past few weeks. Europe has spent most of her cash, and her credits are badly strained. Under such conditions, heavy buying is out of the question.

Imports, on the other hand, are steadily increasing. Large shipments of various materials are arriving and are being shipped direct to buyers here, coming forward on contracts. Offerings of foreign goods on the open market are not unusually large.

LITHOPONE

A better inquiry for lithopone is reported. Producers report that the number of orders is increasing, and that the quantities called for in these orders are also larger. The recent lowering of prices to a basis of 7 cents per pound in bags and 7¼ cents in barrels, both carlot prices, has apparently restored the faith of the buying trade. In some quarters it is felt that the bottom has been reached in this particular market, and consumers are buying with more freedom than for some time past.

BARYTES

Curtailed consumption of barytes is keeping the market in a weak condition. Consumers have not seen any necessity for taking on further stocks, and buying is consequently limited to the actual needs of buyers. Prices hold unchanged, with Southern at $25.00 to $27.00 and Western $24.50 per ton, both f.o.b. mill prices.

ZINC OXIDE

An improved demand for zinc oxide is reported by leading producers, and the market is showing a feeling of more stability. Consumers are beginning to take supplies in larger quantities, although the buying is by means free as yet. Fractional reductions in f.o.b. prices have accounted for part of the additional buying, many consumers having held back their orders in anticipation of such a decline.

LITHARGE

Dealers report that tire manufacturers have been showing more interest in the market of late, and there is a better feeling as a result of this. Trade reports state that stocks of litharge held by the tire makers are running very low. Demand from other users is also said to be packing up, although the market is not showing any marked activity. Prices are held quotably unchanged, American powdered in casks being held on the basis of 8¾ to 9 cents per pound.

DRY COLORS

An increase in buying of dry colors by the paint manufacturing trade has been noted, and the market is more inclined to firmness on some lines. German competition on blues is worrying the domestic trade here, and production is being cut down somewhat. England is credited with having on hand fairly large stocks of dry colors which may in time be dumped on the market here.

Manufacturers of carbon black are alarmed over legislation in several states designed to stop the manufacture of their product. A campaign against the passage of any such laws is being waged. A quiet demand for blues is reported, with the market quotably unchanged. Some call for browns has been noted, but buying is confined to small blocks. Yellows are quoted a little firmer under increased demand. Reds are quiet and nominally unchanged, while greens show a routine tendency.

WHITING

With the lowering of whiting prices to a basis of 75 to 85 cents per cwt., an improved demand has cropped up. Tire manufacturers have come into the market for small quantities, and there are indications of larger buying to come from this quarter of the market.

CRUDES

Benzol shows no quotable change, being held at 27 cents per gallon for the 90 per cent, with pure holding at 30 to 36 cents per gallon. A little business is being done for export. Toluol holds at 30 to 36 cents per gallon for pure in drums, with the commercial grade quoted at 30 to 32 cents per gallon. A routine demand for this crude is reported. Phenol is showing a little more firmness, the market being quoted at 10 to 16 cents per pound for U.S.P. price depending upon the quantity purchased, and the seller. Other crudes hold nominally unchanged, with business routine in all lines.

Current Prices for Chemicals, Fillers, Colors, etc.

Acetone, carlots	lb.	.13	@ —
Acetanilid, C. P., bbls.	lb.	.24	@ .40
Acetone smaller lots	lb.	.13½	@ .14
Acids, Acetic, 56 per cwt.	cwt.	—	@ —
Carbolic, C. P.	lb	.09	@ .12
Muriatic, 20 deg.	cwt.	1.70	@ 2.50
Muriatic, 22 deg.	cwt.	2.50	@ 3.25
Nitric, 40 deg.	cwt.	7.00	@ 7.50
Nitric, 42 deg.	cwt.	7.50	@ 8.00
Sulphuric, 60 deg.	car lots	13.00	@15.00
	tons	13.00	@ 15.00
Sulphuric, 60 deg. car boys		21.00	@ —
Tartaric, crystals	lb.	.39	@ —
Albalith		.07	@ .07½
Aluminum Silicate		Nominal	
Aniline oil, bulk basis Contract		—	@ —
Imported		Nominal	
Domestic		.31	@ .26
Antimony— Oxide	lb.	.07	@ .09
Sulphuret, red	lb.	.25	@ .30
Sulhuret, golden	lb.	.27	@ .30
Sulphuret, crimson	lb.	.40	@ —
Alcohol, denatured, 190 proof		—	@ —
Wood, 95 per cent		1.28	@ 1.30
Ethyl, 190 proof		4.95	@ 5.05
Aldehyde, Ammonia		Nominal	
Ammonia, powdered		.15¾	@ .16
Ammonium Carbonate, domestic	lb.	.15¾	@ .16
Amyl Acetate	gal.	3.60	@ 3.75
Anthracene, 80 per cent.		.85	@ 1.00
Anthroquinine, 95 per cent		1.85	@ 2.00
Asbestine		Nominal	
Asphaltum, Egyptian	lb.	.20	@ .25
Domestic	ton	.30	@ .40
Barium, dust	lb.	.05½	@ —
Barytes, prime white imported	ton	Nominal	
white, domestic	ton	32.00	@ 38.00
off-color, domestic	lb.	20.00	@28.10
Southern, f. o. b. mills		25.00	@27.00
Western, f. o. b. mills		24.50	@ —
Beeswax		.16	@ .54
Benzidine Base	lb.	.95	@ 1.00
Benzol, 90 per cent		.27	@ .34
Benzol, pure bulk, 100		.30	@ .36
Blanc Fixe, dry, bbls	lb.	.05	@ .05½
Burgundy Pitch, dom.	lb.	.05	@ .06½
Foreign		.60	@ .65
Blacks, Drop	lb.	.08	@ .20
Ivory	lb.	.16	@ .45
Carbon, gas, cases	lb.	.12	@ .20
Lampblack, R. M.	lb.	.16	@ .45
Mineral blacks	ton	30.00	@40.00
Blues, Prussian	ton	.60	@ .65
Soluble	lb.	.65	@ .70
Ultramarine	lb.	.15	@ .35
Browns, Umber, Turkey, burnt powdered	lb.	.05	@ .06½
American, burnt	lb.	.04¼	@ .05
Cadmium, sulphide, yellow	lb.	1.40	@ 1.45
Carbon, Disulphide, bulk	lb.	—	@ —
Bisulphide	lb.	.08	@ .09
Casein, C. P.	lb.	.45	@ .48
Castor Oil		.10½	@ .12
Caustic Soda, 76 per ct.	cwt.	3.90	@ 4.00
Chalk, precipated, extra light		.04½	@ .05
heavy	lb.	.03½	@ .04
China clay, domestic	ton	10.00	@ 12.00
imported	ton	16.00	@25.00
China Wood Oil, bbl.	lb.	.09½	@ .10
F. o. b. Pacific Coast		.08¼	@ .09
Chloroform, U. S. P.		.40	@ .43
Clay, Dixie	ton	22.00	@ —
Blue Ridge	ton	22.00	@ —
Coal Tar Pitch		—	@ —
Cottonseed Oil, crude, f. o. b. mills	lb.	6.25	@ —
Prime summer yellow	bbls.	8.40	@ —
Dimethylaniline	lb.	.55	@ .60
Elateron		—	@ —
Formaldehyde, spot	lb.	.18	@ .20
Fullers Earth, powd., carlead lots		17.00	@ 20.00
Fossil flour	lb.	—	@ —
Genasco Mineral Rubber		—	@ —
Gilsonite	ton	60.00	@ 65.00
Glue, extra white	lb	.35	@ .45
medium	lb.	.28	@ .33
low grade		.20	@ .22
foot stock		.18	@ .20
brown foots		.18	@ .22
common bone		.16	@ .18
Glycerine, C. P. (drums)	lb.	.20	@ .21
cans		.22	@ .23
Graphite, flake (bbl.)	lb.	.14	@ .20
powdered (bbl.)	lb.	.04	@ .10
Green, chrome, R. M.	lb.	.38	@ .60
Ground glass (fine)	lb.	.03½	@ .04
Hexamethylene	lb.	1.25	@ 1.30
Hexamethyenetramine	lb.	1.10	@ 1.15
Infusorial earth, powd'd.	lb.	.02	@ .035
bolted	lb.	.035	@ —
Iron ovide, red, reduced grades	lb.	.13	@ .15
red, pure, bright	lb.	—	@ —
Kaolin		—	@ —
Lime, hydrated		—	@ —
Lead, red dry (casks)	lb.	.09¼	@ .09½
sublimed	lb.	—	@ —
White, basic carb.		.08	@ —
white, basic sulp.	lb.	.07¼	@ .07½
Lime flour	lb.	—	@ —
Litharge (casks)	lb.	.08¾	@ .09
English	lb.	—	@ —
Lithopone, domestic, bbls.	lb	.07¼	@ —
in bags	lb.	.07	@ —
M. R. X.		—	@ —
Magnesia, carbonate	lb.	.15	@ .17
calcined light	lb.	.60	@ .65
Magnesite, calcined, pwd.	ton	50.00	@ 65.00
Magnesia, Oxide, heavy		—	@ —
Light		—	@ —
Extra light		—	@ —
Napthalene	lb.	.07¾	@ .08½
Nitrobenzol		.12	@ .14
Naphtha, motor gasoline, (steel bbls)	gal.	.19	@ —
68 @ 70 degrees (steel bbls.)	gal.	.38	@ —
70 @ 72 degrees (steel bbls.)	gal.	.39	@ —
73 @ 76 degrees (steel bbls.)	gal.	.41	@ —
machine (steel bls.)	gal.	.50	@ —
Oil, corn, crude factory	cwt.	8.36	@ —
corn, ref. (bbls.)	cwt.	10.50	@ —
linseed, (bbls.)		.73	@ —
In carloads, spot		.70	@ —
Tank cars		.63	@ —
Oil palm, Lagos	lb.	.07½	@ .07¾
Niger		.07	@ —
Pine, yellow	gal.	1.40	@ 1.45
Distilled	gal.	1.45	@ 1.50
Rapseed, refined	gal.	1.05	@ —
Rapseed blown	gal.	1.14	@ —
Rosin, first rectified	gal.	.51	@ —
Second, run		.53	@ —
Tar (commercial)	gal.	.36	@ —
Oleum Acid, 20 per ct.	ton	22.00	@ 25.00
Orange mineral, Amer.	lb.	.12¼	@ .14
Imported	lb.	Nominal	
Ozokerite		Nominal	
Paraphelenediamine	lb.	1.75	@ 2.25
Petrolatum, bbls., amber	lb.	.08	@ —
Pale yellow		.07½	@ .08½
Parafin, refined, 118 @ 120 m. p.		.08¾	@ .09
127 @ 129 m. p.		.09¾	@ .10¼
137 @ 140 m. p.		—	@ —
Phenol		.15	@ .16
Pumis		.03	@ .08
Pine tar kiln	bbl.	15.00	@ —
Pitch	bbl.	9.00	@ —
Plaster of paris	bbl.	4.25	@ 5.00
Red Tuscan	lb.	.22	@ .30
Red (American)	lb.	.14	@ .16½
Indian (English)		.14	@ .16½
Standard	lb.	—	@ —
Rosin (common to good)— 280 lbs.		8.00	@ —
Rotten stone, powdered	lb.	.02½	@ .04½
Rubber, substitute, black	lb.	—	@ —
White	lb.	—	@ —
Brown	lb.	—	@ —
Mineral, Hard Hydrocarbon	ton	35.00	@45.00
Rosin Oil, first rectified		.51	@ —
Second rectified		.53	@ —
Third rectified		.55	@ —
Fourth rectified		.78	@ —
Soda ash, light 58 pct.	cwt.	1.95	@ 2.15
Sodium Nitrite 96 @ 98 pct.		.16	@ .17½
Solvent Naptha, crude, hvy.		.28	@ .34
Soya Bean Oil, bbls.	lb.	.07¼	@ —
Sellers, tanks, f. o. b. Coast		.05	@ —
Stearic Acid, single		.12¼	@ —
Shellac, fine orange	lb.	.80	@ .81
Sulphur Chloride, drums		.06½	@ .16
Shellac T. N.	lb.	.57	@ .58
Bleached, ordinary	lb.	.55	@ .60
Bleached, bonedry	lb.	.68	@ .72
Silex (silicia)	ton	25.00	@ 40.00
Soapstone, powdered	ton	15.00	@ 20.00
Starch, corn, powd.	cwt.	2.93	@ 3.41
Pearl		2.83	@ 3.31
Jap potato, duty pd.	lb.	.05½	@ —
Sulphur, crude	ton	—	@ —
100 pounds		—	@ —
Roll		2.00	@ 2.60
Commercial superfine		2.00	@ 2.90
Talc, American	ton	18.00	@ 20.00
French	ton	30.00	@ 36.00
Thiocarbanilid		—	@ —
Telulol, pure, in drums, gal.		.30	@ .36
Commercial		.30	@ .32
Tripolite earth	lb.	.01½	@ —
Turpentine, pure gum— Spirit	gal.	.62	@ —
Wood	gal.	.60	@ .61
Venice, artificial	gal.	.15	@ .18
True		2.85	@ 3.00
Vermillion, English	lb.	1.00	@ 1.10
American		.25	@ .30
Vorite		Nominal	
Wax, beeswax, crude, yel.	lb.	.21	@ .22
Refined		.26	@ .27
Bayberry		.25	@ .26
Ceresin, white	lb.	.14	@ .15
Yellow		.13	@ .14
Whiting, commercial	cwt.	.75	@ .85
Gilders Bolted		1.45	@ —
Paris, white Amer.	cwt.	1.50	@ 1.60
English, cliffstone	cwt.	1.30	@ —
Quaker	ton	13.00	@ 15.00
Xylol (gal) pure		.42	@ .45
Commercial		.30	@ .35
Zinc Oxide, French process Red Seal		.10	@ .10½
Green Seal		.11	@ .11½
White Seal		.12¼	@ .12½
Leaded Grades— Commercial, lead free		.09¼	@ .09¾
5 per ct. lead sulphate		.08	@ .08½
10 per ct. lead sulphate		.07⅞	@ .08¾
20 per ct. lead sulphate		.07¾	@ .08½
35 per ct. lead sulphate		.07⅞	@ .08¼
Zinc Sulphate		.03¼	@ .03½

Crude Rubber

NEW YORK, FEBRUARY 20, 1921

The slump in crude market prices noted early in the month has continued, and the trade has seen prices steadily decline on many lines, until the market is almost as badly off as during the closing days of 1920, when depression was at its height. The trade, however, is regarding things in an entirely different spirit now, and the belief persists that the market will be "out of the woods" in a very short time, and that better conditions are ahead.

Some uneasiness is manifested over reports from England. Private advices from British firms indicate that there are large quantities of low priced rubber available in the British market. Should any sustained advance be made in the market in the United States, it is probable that Great Britain would begin feeding cheaper rubber to the domestic market and that the normal upward progress of the rubber market would be stayed. Normally, such a condition of affairs would be acceptable to the manufacturing trade, although naturally distasteful to importers and dealers. At this time, however, when the larger manufacturers have sizeable inventories of high priced rubber on hand, such a dumping process would be unwelcome to practically all factors in the market.

Tire manufacturers generally appear to have on hand, or held for delivery to their warehouses, sufficient crude rubber to take care of their normal requirements for some time yet. When manufacturing on a large scale is resumed, however, it is believed in the trade that the surplus stocks of the tire makers will soon be worked out, and that the manufacturers will once again be heavy buyers in the spot market. Already, there is some disposition to buy crude for delivery late in the year, but offerings are not numerous, owing to the general belief on the part of holders that the market will be on a higher basis by the end of 1921.

Some movement of stocks of crude rubber held on the seaboard on future contracts is to be noted, but the move toward the manufacturing towns in the West is not yet heavy. Importers and dealers hope to ship a large part of the surplus holdings on to the factories later on in the year.

Ceylons			
Smoked sheets, ribbed, spot	.17½	@	.18½
Smoked sheets ribbed Feb. Mch.	.18	@	.18½
Smoked sheets ribbed April June	.21	@	.21¼
Smoked sheet plain, spot	.16	@	—
First latex pale crepe	.19½	@	.20
Amber crepe, No. 1	.17	@	—
Amber crepe, No. 2	.16	@	—
Amber crepe, No. 3	.15	@	—
Clean brown crepe	.14½	@	—
Light clean brown crepe	.16	@	.16¼
Roll brown crepe	.12½	@	—
Grand Central crepe	.13½	@	—
Africans			
Loando Niggers	.08	@	—
*No. 1 Benguella	.08	@	—
*No. 2 Benguella	.07	@	—
Lapori Ball	.13	@	—
Paras			
Up-river fine	.17½	@	—
Up-river medium	.14	@	.14½
Up-river coarse	.13½	@	.14
Corinto prime	.12	@	—
Islands fine	.17	@	—
*Maderia fine	.21	@	—
Cameta	.11	@	.11½
Islands coarse	.11	@	—
Centrals			
Corinto prime	.14	@	—
Esmerelda prime	.12	@	—
Miscellaneous			
Guayule wet	—	@	—
*Balata block Panama	.23	@	—
Balata sheets	.09	@	—
Palembang	.06¾	@	—
Bangermassin	.06¼	@	—
Columbian Block Balata	.46	@	—
Prime Pontianac	.06¼	@	—

*Nominal

Scrap Rubber

NEW YORK, FEBRUARY 20, 1921

A better feeling is to be noted in the market for scrap rubber, and dealers are looking for a revival in trading early in the second quarter of the year. Reclaimers at the present time are coming into the market for scattered lots, but are taking stocks only as actually required and are buying mainly in small lots.

Stocks of scrap rubber in the hands of the jobbing trade are said to be burdensome in many quarters of the market, and the wholesalers have made still further price reductions in an effort to stimulate the movement of the goods. To date, however, all efforts of the gatherers to speed up sales via the price cutting method have failed to bring about any tangible results, insofar as increased sales are concerned.

Many manufacturers who normally use stocks of reclaimed rubber in the manufacture of their products are still using the crude rubber, buying the cheaper grades at the record low prices now prevailing. While the use of the crude stock permits of the manufacture of a better product, and makes the working of the manufacturers during the producing process much simpler, those producers who have been accustomed to the use of reclaimed stock in normal times are expected to discontinue using crude rubber when the much talked of advance in prices arrives.

Some export inquiries have been received in the market during the past two weeks, on inquiry for 10,000 pounds for shipment abroad being received.

Revised quotations obtaining in the New York market are as follows:

	Cents per Pound		
Solid Tires	1.50	@	2.00
Auto Tire Peelings	2.50	@	2.75
Truck Tires	1.00	@	1.75
Black Rubber	1.50	@	2.00
Boots and Shoes	3.00	@	3.50
Arctics, trimmed	2.75	@	3.50
Arctics, untrimmed	—	@	—
Tire—Automobile	1.00	@	1.25
Bicycles, pneumatic	.75	@	1.00
Mixed Hose	.50	@	.75
Air Brake	1.50	@	—
Inner Tubes No. 1	6.50	@	7.00
Inner Tubes, No. 2	4.50	@	5.00
Red Tubes	2.50	@	4.00

Exports of Rubber for December

Figures recently issued by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce, show that exports of rubber manufactures and insulated wire cables from the United States during the month of December, 1920 totalled $8,309,602. These figures do not include the exports to Porto Rico and Hawaii which aggregated $368,631 for the month of December. The exports during December not including Porto Rico and Hawaii show a slight decrease when compared to exports amounting to $8,455,657 for the month of November, 1920. Figures for exports to Porto Rico and Hawaii have fallen off as may be seen by the fact that they totalled $414,607 for November, 1920.

The value of articles exported for December, 1920, not including those to the island possessions, were as follows: belting, $491,525; hose, $443,610; packing $164,613; boots, $38,799; shoes, $950,304; druggist's rubber sundries, $182,898; soles and heels, $85,918; auto tire casings, $3,264,711; inner tubes, $366,468; solid tires, $244,527; all other tires, $30,945; all other manufactures of rubber, $743,977; insulated wire and cables, $1,301,307.

Exports to Porto Rico and Hawaii for December, 1920, were as follows: belting, hose and packing, $38,555; automobile tires, $226,187; all other tires, $2,882; all other manufactures of rubber, $101,007.

New York Stock Prices

Following are the New York Stock Exchange quotations on the various rubber stocks listed for February 17:

	Bid	Asked
Ajax Rubber Corp.	31¼	32
Fisk Rubber Co.	14⅝	14⅞
B. F. Goodrich Co.	39	39⅛
do pfd	82½	83
Kelly-Springfield Tire	45⅝	46¼
Keystone T. & R.	14½	14¾
U. S. Rubber	70¼	70½

Akron Stock Prices

(Special Akron Correspondence)

The announcement that Goodyear directors had completed plans for refinancing after protracted sessions with New York bankers and creditors served to send both common and preferred issues of that company down to new low levels on the Akron stock market. Goodyear common dipped to 12 and preferred to 33. The slump was short-lived and common climbed back above 15 and preferred above 35 the next day.

There is little investing in rubber shares in Akron at present, not that Akron isn't willing to buy but most everyone is carrying all the load possible in these days of depression. Hence a rather inactive market has caused some rubber shares to slump again this month.

Republic common dropped to seven-eights in the face of an announcement by the company that it had tire orders on hand which would keep Canton and Youngstown plants busy for two months. Eight per cent preferred of the same company is down to 10.

Firestone common is back to 80 and Miller common to 85. Portage common is down to 17 and Mason to 19. Mohawk had advanced to 200.

Other stocks appear to be holding their own.

Following are the quotations for February 15:

	Bid.	Asked
Am. R.-T. com.	40	65
do pfd	...	90
Amazon Rubber	...	45
Firestone com	78	84
do 6 pct. pfd	80	83
x do pct. pfd	78	80
General	180	250
do 7 pct. pfd	80	90
xB. F. Goodrich com	39½	40
do 7 pct. pfd	82	83
do 5-yr. 7 pct. notes	90	92½
Goodyear com	**14⅛**	**15⅝**
do 7 pct. pfd	35	37
India Rubber com	100	130
x do 8 pct. pfd	...	80
Mason com	**19**	**20**
do 7 pct. pfd	65	66
Marathon com	3	4
Miller Rubber com	85	87
do 8 pct. pfd	...	80
Mohawk Rubber	155	200
Portage Rubber com	17	21
do 7 pct. pfd	...	42
Republic Rubber com	⅞	1½
do 7 pct. pfd	...	30
do 8 pct. pfd	10	11
Rubber Products	...	100
Star Rubber com	...	100
do 8 pct. pfd	...	100
Swinehart T.-R. com	...	40
do 7 pct. pfd	...	70
Phoenix com	...	20
do pfd	...	90
Standard Tire com	...	125
do pfd	...	90

American Rubber Patents

ISSUED JANUARY 25, 1921

1,366,358—To Alexander M. Clark, Knoxville, Borough, Pa. Blow-out closure device or patch for pneumatic tires.

1,366,407—To Charles A. Mendenhall, Farmland, Ind. Resilient wheel.

1,366,437—To Otto F. Wagenhorst, Akron, Ohio. Gas mask.

1,366,501—To Maximilian Charles Schweinert, West Hoboken, and Henry P. Kraft, Ridgewood, N. J. Tire-valve.

1,366,518—To Andrew G. Buchman, Kenosha, Wis. Detachable rubber heel.

1,366,696—To Ora M. Lockwood, Buffalo, N. Y. Resilient tire.

1,366,750—To Fred Smith and Thomas H. Brittain, Akron, Ohio. Tire-casing core.

1,366,797—To Allan A. Harris Randolph, Mass., assignor to Frank Berenstein, Chelsea, Mass. Rubber heel.

1,366,849—To John B. Tittle, Jefferson, Ohio. Inner tube for tires.

ISSUED FEBRUARY 1, 1921

1,366,969—To Charles W. Steele, Akron, Ohio, assignor to Firestone Tire & Rubber Co., Akron, Ohio. Machine for manufacturing articles of rubber and fabric.

1,367,011—To Rolla B. Bostwick, Duquesne, Pa. Vehicle-tire.

1,367,068—To Frank J. MacDonald, Akron, Ohio, assignor to Firestone Tire & Rubber Co., Akron, Ohio. Selvage trimmer.

1,367,180—To Burgess Darrow, Akron, Ohio, assignor to Goodyear Tire & Rubber Co., Akron, Ohio. Method of manufacturing pneumatic-tire treads.

1,367,446—To Charles A. Witham, Lewiston Me. Tire-spreader.

tires.

1,367,490—To Andre Jules Michelin, Paris,